

EPA Region 5 Records Ctr.



265452

**FINAL  
HEALTH AND SAFETY PLAN  
FOR  
ELLSWORTH INDUSTRIAL PARK SITE  
DOWNERS GROVE, ILLINOIS**

**NOVEMBER 2003**

**This document was prepared by WESTON in accordance with the terms of the U.S. EPA Region V Contract No. 68-W7-0026, and contains Confidential Business Information.**

Work Assignment No.155 -RICO-B51W

Document Control No. RFW155-2D-AOHS



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7 November 2003

Mr. Mazin Enwiya  
Work Assignment Manager  
U.S. Environmental Protection Agency - Region V  
77 West Jackson Blvd.  
Chicago, Illinois 60604

U.E. EPA Contract No. 68-W7-0026  
Work Assignment No. 155-RICO-B51W  
Document Control No. RFW155-2A-AOHS

Re: Revised Health and Safety Plan  
Ellsworth Industrial Park Site  
Downers Grove, Illinois

Dear Mr. Enwiya:

Weston Solutions, Inc. (WESTON®) has enclosed three copies of the revised Health and Safety Plan (HASP) for the above referenced site. Revisions and modifications are based on comments on the draft documents received from U.S. EPA in your letter dated 27 October 2003. The following paragraphs provide a summary of the comments, responses, and modifications:

#### **Health and Safety Plan**

Comment A-1: *EHS Analysis Checklist-Weston Field Operations Form. It is not clear why on this form carcinogen was checked off, yet on Form 3 it was left unmarked.*

Response: The carcinogen box on Form 3 was inadvertently left unmarked. This has been changed on Form 3 to now incorporate the carcinogen box as marked.

Comment A-2: *The HASP does not specify the etiological agents. I recommend that the etiological agents and the routes of exposure be specified.*

Response: Etiological agents are not of concern at the site. The marked locations for etiological agents have been removed.

Comment A-3: *The work involves sampling with a Geoprobe and well installation. The physical hazard table (Page 6) identifies "crushing/pinch points/overhead hazards/electrocution" hazards and refers to the attached procedure FLD22-Heavy Equipment Operation. FLD22, however, does*





Mr. Mazin Enwiya  
U.S. EPA

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*not appear to address potential hazards posed by overhead utilities. The attached procedure FLD34-Utilities provides comprehensive treatment of underground utilities, but likewise does not address overhead hazards. If overhead power lines are present on the site, it creates a potential hazard for the work being performed, and should be addressed.*

Response: FLD34-A, specific to addressing overhead utility hazards, has been incorporated into the HASP in DRAFT form to address overhead utility hazard issues.

Comment A-4: Form 8, page 7. *It is not clear why this form was not completed. I recommend that this form be completed.*

Response: Form 8 has been fully completed based on available information specific to the site.

Comment A-5: *The HASP does not describe the location of work zones on the site. For sampling, boring and well installation work, a certain perimeter around each active boring operation is usually designated as an Exclusion Zone.*

Response: Exclusion zones have been identified as intervals greater than or equal to 1.5 times the maximum height of the extended rig mast, or 10-feet from the rig, whichever is greater.

Comment A-6: *The HASP does not expressly prohibit eating, drinking, smoking, etc. in the Exclusion Zone.*

Response: The HASP has been updated to prohibit eating, drinking, and smoking within the Exclusion Zone.

Comment A-7: Form 13, page 12. *The HASP states that level C should be used if the organic gases and vapors concentrations are 50-100 ppm. I recommend that Form 10 describes Level C protection. On Form 24, page 21, I also recommend that Level C and Respiratory Protection be covered at the site-specific training meeting.*

Response: The HASP has been updated to incorporate Level C protection descriptions on Form 10 as well as adding Level C and Respiratory Protection to the site-specific training meetings.



Mr. Mazin Enwiya  
U.S. EPA

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Comment A-8: Form 17, page 16. *It is not clear how the distilled water and Alconox solution, which will be used for equipment decontamination, will be collected and disposed of.*

Response: The distilled water and Alconox solution will be disposed of in 55-gallon drums. Specific disposal criteria have been incorporated into the HASP.

Comment A-9: Form 25. *It is not clear which risk may be considered H, M, or L. I recommend that an explanation be provided for these risk levels.*


Response: Further clarification of this point was requested to the U.S. EPA. Further comment requested the reasoning for utilizing the M classification of risk hazards on Form 8. As per WESTON safety protocol, the M, or moderate risk category, is utilized whenever the risk beyond normal day to day actions by public personnel is elevated. Form 8 has M checked for both chemical and physical hazards. This is due to WESTON personnel being subjected to non-naturally occurring elevated chemical constituent levels as well as increased physical hazards by working around drilling equipment and traffic.

Comment A-10: *The HASP does not specify where the hospital route map will be posted. I recommend the location/posting area of the hospital map be specified in the HASP.*

Response: The hospital location map will not specifically be posted at the site due to the mobile nature of the project. The hospital route map is kept with the HASP with the SHSC on site. In addition, each person working on the project on site will be given a copy of the hospital route map for their records.

If you have any questions or require further information, please contact me at (847) 918-4016.

Very truly yours,  
Weston Solutions, Inc.



Kurt T. Fischer, P.G.  
Site Manager

KF\tg

Enclosure

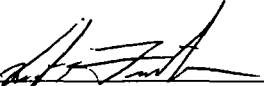
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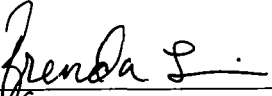
**NOVEMBER 2003**

Approved By: \_\_\_\_\_

  
Kurt Fischer, P.G.  
Site Manager

11/7/03  
Date

Approved By: \_\_\_\_\_

  
for James Burton, P.E.  
Program Manager

11/7/03  
Date

## HASP COVER PAGE

<b>Project Name:</b>	USEPA – Ellsworth Industrial Park Site
<b>Project Number:</b>	20064.155.100.0132
<b>Project Manager:</b>	Kurt Fischer
<b>Assigned SHSC:</b>	Barry Crawford
<b>Assigned Safety Officer:</b>	Eric Keeley

<b>Will Dangerous Goods be shipped to or from the field? YES <input type="checkbox"/> NO <input checked="" type="checkbox"/></b>	
<b>Assigned Dangerous Goods Shipper:</b>	Name: Phone:
<b>Assigned Shipping Advisor:</b>	Name: Phone:

<b>Environmental Compliance Plan Attachments (Check All that Apply):</b>	
<input type="checkbox"/>	Pre-proposal checklist
<input checked="" type="checkbox"/>	EHS Analysis Checklist
<input type="checkbox"/>	Project Specific Environmental Compliance Plan

# EHS ANALYSIS CHECKLIST-WESTON FIELD OPERATIONS

This form is to be completed prior to task implementation (and modified during implementation if significant changes occur) to verify that hazards have been identified and that appropriate protection is determined and utilized. This form is additionally to be used as a daily and as necessary training tool. This form (or a copy of same) is to be posted for workers to observe and then filed upon completion of task. See Instructions and Use Criteria following table for information and guidance.

Site Manager/EHS Officer: Barry Crawford				Task Description: Perform soil borings, collect soil and groundwater samples		Task Team (name or reference via daily sign-in sheet)	
Date: September 2003				Location: Ellsworth Industrial Park, Downers Grove, IL			
HAZARDS IDENTIFIED (check those applicable)							
	Chemical	X	Biological		Physical		Remote Areas
X	Flammable/combustible	X	Insects		Noise		Materials handling
X	Corrosive		Animals		Heat		High Pressure Washers
	Oxidizer	X	Plants		Cold		Hand and Power Tools
	Reactive		Mold/Fungus		Inclement Weather		Low Illumination
	Toxic		Viral/Bacterial		Hot Work		Drilling & Boring
X	Inhalation				Confined Spaces		Striking against/Struck-by
X	Eyes/Skin	X	Radiochemical		Stored hazardous Energy		Caught-in/Caught between
	Pesticides		Ultra-Violet		Elevation		Pushing/pulling
X	Carcinogen	X	Sunlight		Utilities		Falls at same level
	Asbestos		Infrared		Machinery		Falls from elevation
	Lead		Lasers		Mobile equipment		Repetitive motion
	UXO/OE/ CWM		XRF		Cranes		Electricity (110V or less)
	Process Safety		Density Gauges	X	Manual Material Handling		Electricity (> 110V)
	Applying Paint/Coatings		Isotopes		Ladders	X	Slippery surface Ice/Snow
					Scaffolding	X	
REQUIRED PROTECTION (check those applicable)							
	Engineering Controls	X	Trained/Certified		Air Purifying Respirator		Diving/SCUBA
	Guard Rails		Hot Work Permit	X	Hard Hat		Diving/Surface Supplied
	Machine Guards		CSE Permit		Ear Plugs	X	
	Sound Barriers		Lockout/Tag Out	X	Ear Muffs		Contingency
	Enclosure		Work Permit		Safety Glasses	X	Emergency Plan Known
	Elevation		Dig Safe Permit		Goggles	X	Eye wash
	Isolation		Contingency Plan		Chemical Goggles	X	First Aid Kit Location
	GFCI		Critical Lift Plans		Face Shield	X	Fire Extinguisher Location
	Assured Ground Program		Equip. Inspection Sheets		Thermal Shield		Spill Kit Location
	Apply Anti-slip/skid Mat				Welding Mask		Severe weather shelter
		X	PPE		Cutting Glasses		Evacuation Routes
X	Administrative Control		Air Supplying Respirator		Cotton Coverall		
X	Qualified for task		SCBA		Tyvek Coveralls		
					Coated Coveralls		
Any Modification to Tasks (list)				Reasons for any changes indicated above			

## EHS ANALYSIS CHECKLIST-WESTON FIELD OPERATIONS

This form is to be completed prior to task implementation (and modified during implementation if significant changes occur) to verify that hazards have been identified and that appropriate protection is determined and utilized. This form is additionally to be used as a daily and as necessary training tool. This form (or a copy of same) is to be posted for workers to observe and then filed upon completion of task. See Instructions and Use Criteria following table for information and guidance.

No	Management or Generation of Hazardous Waste*	* Environmental Compliance/Waste Management Plan Required
No	Management or Generation of Investigation Derived Waste*	
No	Treatment, Storage, or Disposal of Hazardous Waste*	Assure training and site preparation.
No	Contingency to prevent or contain hazardous materials or oil spills or discharges to drains, body of water, soil*	
No	Disturbing of Asbestos Containing Materials (ACM)*	Assure training and licensing for Asbestos Remediation Activities
No	Application of Pesticides or Herbicides*	
No	Work on Above or Underground Storage Tanks*	
No	Transportation, Storage or Disposal of Radioactive Material*	Assure training and licensing for use of Radioactive Materials/Sources.
No	Activities producing or generating Air Emissions (or fugitive "fence-line" emissions) requiring either monitoring and/or permit*	
Yes	Excavations, Drilling, Probing or other activities that could impact underground utilities, pipelines, sewer or treatment systems.	
No	Shipment of Hazardous Waste off-site*	Assure waste identification , manifesting, marking, labeling, placarding.
	Shipment of Samples in accordance with DOT/IATA	

### Instructions and Use Criteria:

This form is used to prepare appropriate task/risk analyses (activity hazard analyses) and safety plans. Secondary, but no less important is the use of this form routinely to track changes in jobs/tasks so that workers, public and the environment are adequately protected. In order for this to occur, assure the following:

Review work scope. Considering both safety and productivity break down the job/task and determine 1) How the job/task is to be performed, 2) In what order will the job/tasks be performed, 3) What equipment or materials will be needed, 4) What specific skills or training will be necessary.

Does the work require hot work permits, confined space entry permits, lockout/tagout, other permits or permissions/clearances? NO

Will it be necessary to barricade for clear work zones (roadway or on-site)? No

Of the hazards identified in the table above evaluate risk of injury or damage. -

Develop hazard control measures based upon task/risk utilizing protection sequence of:

- Engineering design to eliminate hazard/risk.
- Substitution of materials/chemicals/methods.
- Incorporation of safety devices (e.g., guards, interlocks).
- Administrative controls (e.g., work methods, procedures, training).
- Provisions for PPE.

Is there any special contingency planning necessary (e.g., rescue, spill control)? People? Procedures? Training? NO

Have you evaluated and planned job/task to assure acceptable risk for workers, public and environment? YES

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## ATTACHMENTS

### Section

Attachment A	-	Chemical Contaminants Data Sheets
Attachment B	-	Material Safety Data Sheets (MSDS)
Attachment C	-	Safety Procedures/Field Operating Procedures
Attachment D	-	Site Specific Hazard Communication Program
Attachment E	-	Air Sampling Program Data Sheets

## SITE HEALTH AND SAFETY PLAN (HASP)-FORM 1

**Prepared by:** Robert Majchrzak

<b>W.O. Number:</b> 20064.155.100.0132	<b>Date:</b> 9/26/03
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**Project Identification**

Office: Weston Solutions, Vernon Hills, IL  
Site Name: Ellsworth Industrial Park Site  
Client: U.S. EPA  
Work Location Address: Ellsworth Industrial Park  
Downers Grove, IL

**Site History:** IEPA conducted a ground water investigation in the spring of 2001. The investigation, which included several private well samples, identified chlorinated solvent compounds in the ground water. U.S. EPA conducted a ground water investigation in March 2002. The results identified TCE/PCE near facilities within the industrial park.

**Scope of Work:**  
Perform a site assessment on several business properties that are located in Ellsworth Industrial Park, Downer's Grove, Illinois. The site assessment will include groundwater sampling, subsurface soil sampling, installation of overburden and bedrock wells, utility clearances, marking of drilling/sampling locations and GPS activities. A WESTON subcontractor will conduct the soil boring and well installation. Geoprobe/MIP borings will be conducted by a WESTON subcontractor. WESTON/RAC will conduct oversight, photo/written documentation, air monitoring, sampling, and marking of locations.

☐ Sites visit only; site HASP not necessary. List personnel here and sign off below:

**Regulatory Status:**

Site regulatory status:

CERCLA/SARA	RCRA	Other Federal Agency
<input checked="" type="checkbox"/> U.S. EPA	<input type="checkbox"/> U.S. EPA	<input type="checkbox"/> DOE
<input type="checkbox"/> State	<input type="checkbox"/> State	<input type="checkbox"/> USACE
<input type="checkbox"/> NPL Site	<b>NRC</b>	<input type="checkbox"/> Air Force
<input checked="" type="checkbox"/> OSHA	<input type="checkbox"/> 10 CFR 20	<input type="checkbox"/> _____

Hazard Communication (Req'd See Attachment D)

<input checked="" type="checkbox"/> 1910	<input checked="" type="checkbox"/> 1926	<input type="checkbox"/> State
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**Safety Officer Manual (Required to be On-Site)**  
Based on the Hazard Assessment and Regulatory Status, determine the Standard HASP(s) applicable to this project. Indicate below which Standard HASP will be used and append the appropriate pages of this form along with the Standard Plan.

<input type="checkbox"/> Stack Test	<input type="checkbox"/> _____
<input type="checkbox"/> Air Emissions	<input type="checkbox"/> _____
<input type="checkbox"/> Asbestos	<input type="checkbox"/> _____
<input type="checkbox"/> Industrial Hygiene	<input type="checkbox"/> _____
<input type="checkbox"/> _____	<input type="checkbox"/> _____

\_\_\_\_\_

**Review and Approval Documentation:**

Reviewed by: \_\_\_\_\_  
SO/DSM/CHS      Eric Keeley      Date: \_\_\_\_\_  
Name (Print)      Signature

Other Dan Leskovec Date: \_\_\_\_\_  
Name (Print) Signature

Approved by: \_\_\_\_\_  
Project Manager      Kurt Fischer      Date: \_\_\_\_\_  
Name (Print)      Signature

### Hazard Assessment and Equipment Selection:

In accordance with WESTON's Personal Protective Equipment Program and 29 CFR 1910.132, at the site prior to personnel beginning work, the SHSC and/or the Site Manager have evaluated conditions and verified that the personal protective equipment selection outlined within this HASP is appropriate for the hazards known or expected to exist. (Refer to Safety Officer Manual Section 2, Personal Protection Program, for guidance.)

☒ SHSC    ☐ Site Manager    Barry Crawford    Date \_\_\_\_\_  
Name (Print)                      Signature

Project start date: 10/20/03 End date: 12/20/03	This site HASP <b>must</b> be <b>reissued/reapproved</b> for any activities conducted after:  Date: <u>3/26/04</u>	Amendment date(s) By: Robert Majchrzak 1. 2. 3. 4. 5.
--	--	--

## WESTON REPRESENTATIVES-FORM 2

Organization/Branch	Name/Title	Address	Telephone
VHI	Jim Burton – Program Manager	750 East Bunker Court Vernon Hills, IL 60061-1450	847/ 918-4039
VHI	Kurt Fischer – Project Manager	750 East Bunker Court Vernon Hills, IL 60061-1450	847/ 918-4016
VHI	Barry Crawford - SHSC	750 East Bunker Court Vernon Hills, IL 60061-1450	847/ 918-4084

### Roles and Responsibilities:

WESTON/RAC will conduct oversight, photo/written documentation, air monitoring, sampling, and marking of locations. Jim Burton will retain overall responsibility of project. Kurt Fischer will function as Project Manager and be responsible for day-to-day operations. Barry Crawford will be the SHSC and function as the site leader.

## WESTON SUBCONTRACTORS

Organization/Branch	Name/Title	Address	Telephone
TBD			
Lucky Locators, LLC			

### Roles and Responsibilities:

Will conduct soil boring, monitoring well installation, Geoprobe/MIP borings. Lucky Locators will locate utilities.

\*Note: The Field/Site Supervisor shall be responsible for supervision of the Contractor and Lower Tier Subcontractor Personnel

## SITE SPECIFIC HEALTH AND SAFETY PERSONNEL

The Site Health and Safety Coordinator (SHSC) for activities to be conducted at this site is: Barry Crawford

The SHSC has total responsibility for ensuring that the provisions of this Site HASP are adequate and implemented in the field.

Changing field conditions may require decisions to be made concerning adequate protection programs. Therefore, the personnel assigned as SHSCs are experienced and meet the additional training requirements specified by OSHA in 29 CFR 1910.120.

### Qualifications:

40-hour, 8-hour refresher, SHSC, Blood Borne, First Aid/CPR

### Designated alternates include:

Ben Maradkel, Yoshie Hagiwara

## HEALTH AND SAFETY EVALUATION FORM 3

### Hazard Assessment

Background Review: ☒ Complete    ☐ Partial    If partial why?

### Activities Covered Under This Plan:

No.	Task/Subtask	Description	Schedule
1		Ground Water, Soil Investigation	
2		Oversight	
3		Well Installation	

### Types of Hazards:

1 Numbers refer to one of the following hazard evaluation forms. Complete hazard evaluation forms for each appropriate hazard class.

<b>Physiochemical 1</b> <input checked="" type="checkbox"/> Flammable <input checked="" type="checkbox"/> Explosive <input type="checkbox"/> Corrosive <input checked="" type="checkbox"/> Reactive <input type="checkbox"/> O <sub>2</sub> Rich <input type="checkbox"/> O <sub>2</sub> Deficient	<b>Chemically Toxic 1</b> <input checked="" type="checkbox"/> Inhalation <input checked="" type="checkbox"/> Carcinogen <input checked="" type="checkbox"/> Ingestion <input type="checkbox"/> Mutagen <input checked="" type="checkbox"/> Contact <input type="checkbox"/> Teratogen <input type="checkbox"/> Absorption <input type="checkbox"/> OSHA 1910.1000 Substance (Air Contaminants) <input type="checkbox"/> OSHA Specific Hazard Substance Standard (Refer to following page for listing)	<b>Radiation 3</b> Ionizing: <input type="checkbox"/> Internal exposure <input type="checkbox"/> External exposure  Non-ionizing: <input type="checkbox"/> UV <input type="checkbox"/> IR <input type="checkbox"/> RF <input type="checkbox"/> MicroW <input type="checkbox"/> Laser	<b>Biological 2</b> <input type="checkbox"/> Etiological Agent <input checked="" type="checkbox"/> Other (plant, insect, animal)  <input checked="" type="checkbox"/> <b>Physical Hazards 4</b> <input checked="" type="checkbox"/> Construction Activities
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### Source/Location of Contaminants and Hazardous Substances:

<b>Directly Related to Tasks</b> <input type="checkbox"/> Air <input type="checkbox"/> Other Surface <input checked="" type="checkbox"/> Groundwater <input checked="" type="checkbox"/> Soil <input type="checkbox"/> Surface Water <input type="checkbox"/> Sanitary Wastewater <input type="checkbox"/> Process Wastewater <input type="checkbox"/> Other	<b>Indirectly Related to Tasks — Nearby Process(es) That Could Affect Team Members:</b> <input type="checkbox"/> Client Facility/WESTON Work Location <input checked="" type="checkbox"/> Nearby Non-Client Facility Describe: Traffic  <input checked="" type="checkbox"/> Have activities (task[s]) been coordinated with facility? Each facility will be notified of impending schedule and work.
--	--

# HEALTH AND SAFETY EVALUATION-CHEMICAL HAZARDS OF CONCERN-FORM 4

☐ N/A

## Chemical Contaminants of Concern

Provide the data requested for chemical contaminants on HASP Form 25 or attach data sheets from an acceptable source such as NIOSH pocket guide, condensed chemical dictionary, ACGIH TLV booklet, etc. List chemicals and concentrations below and locate data sheets in Attachment B of this HASP.

☐ N/A

Identify hazardous materials used or on-site and attach Material Safety Data Sheets (MSDSs) for all reagent type chemicals, solutions, or other identified materials that in normal use in performing tasks related to this project could produce hazardous substances. Ensure that all subcontractors and other parties working nearby are informed of the presence of these chemicals and the location of the MSDSs. Obtain from subcontractors and other parties, lists of the hazardous materials they use or have on-site and identify location of the MSDSs here. List chemicals and quantities below and locate MSDSs in Attachment B of this HASP.

Chemical Name	Concentration (if known)	Chemical Name	Quantity
TCE	1-300 ppb (water)	Alconox	1 quart
PCE	1-50 ppb (water)	Fuel (Diesel)	5 gallons
TCE	5-250 ppm (soil/sediment)	Methanol	0.5 kg (17ds) calibration cylinder
PCE	5-250 ppm (soil/ sediment)	Isobutylene	0.5 kg (17 ds) calibration cylinder
1,2 PCE	60 ppb	Hydrogen	2 kg (for FID)
1,1,1 TCA	<10 ppb		
Toluene	<10 ppb		

## OSHA-SPECIFIC HAZARDOUS SUBSTANCES

The following substances may require specific medical, training, or monitoring based on concentration or evaluation of risk. See the appropriate citation listed under 29 CFR 1910 or 1926 for additional information.

<input type="checkbox"/> 1910.1001 Asbestos	<input type="checkbox"/> 1910.1002 Coal tar pitch volatiles	<input type="checkbox"/> 1910.1003 4-Nitrophenyl, etc.	<input type="checkbox"/> 1910.1004 alpha-Naphthylamine
<input type="checkbox"/> 1910.1005 [Reserved]	<input type="checkbox"/> 1910.1006 Methyl chloromethyl ether	<input type="checkbox"/> 1910.1007 3,3'-Dichlorobenzidine (and its salts)	<input type="checkbox"/> 1910.1008 bis-Chloromethyl ether
<input type="checkbox"/> 1910.1009 beta-Naphthylamine	<input type="checkbox"/> 1910.1010 Benzidine	<input type="checkbox"/> 1910.1011 4-Aminodiphenyl	<input type="checkbox"/> 1910.1012 Ethyleneimine
<input type="checkbox"/> 1910.1013 beta-Propiolactone	<input type="checkbox"/> 1910.1014 2-Acetylaminofluorene	<input type="checkbox"/> 1910.1015 4-Dimethylaminoazobenzene	<input type="checkbox"/> 1910.1016 N-Nitrosodimethylamine
<input type="checkbox"/> 1910.1017 Vinyl chloride	<input type="checkbox"/> 1910.1018 Inorganic arsenic	<input type="checkbox"/> 1910.1025 Lead (Att. FLD# 46)	<input type="checkbox"/> 1910.1027 Cadmium
<input type="checkbox"/> 1910.1028 Benzene	<input type="checkbox"/> 1910.1029 Coke oven emissions	<input type="checkbox"/> 1910.1043 Cotton dust	<input type="checkbox"/> 1910.1044 1,2-Dibromo-3-chloropropane
<input type="checkbox"/> 1910.1045 Acrylonitrile	<input type="checkbox"/> 1910.1047 Ethylene oxide	<input type="checkbox"/> 1910.1048 Formaldehyde	<input type="checkbox"/> 1910.1050 Methyleneedianiline
<input type="checkbox"/> 1910.1051 1,3 Butadiene	<input type="checkbox"/> 1910.1052 Methylene chloride		

# HEALTH AND SAFETY EVALUATION-2 BIOLOGICAL HAZARDS OF CONCERN-FORM 5

## ☒ Poisonous Plants (FLD 43)

Location/Task No(s).:

Source: ☐ Known ☒ Suspect  
 Route of Exposure: ☐ Inhalation ☐ Ingestion  
☒ Contact ☐ Direct Penetration

Team Member(s) Allergic: ☐ Yes ☒ No  
 Immunization required: ☐ Yes ☒ No

## ☒ Insects (FLD 43)

Location/Task No(s).:

Source: ☐ Known ☐ Suspect  
 Route of Exposure: ☐ Inhalation ☐ Ingestion  
☒ Contact ☒ Direct Penetration

Team Member(s) Allergic: ☐ Yes ☒ No  
 Immunization required: ☐ Yes ☒ No

## ☒ Snakes, Reptiles (FLD 43)

Location/Task No(s).:

Source: ☐ Known ☒ Suspect  
 Route of Exposure: ☐ Inhalation ☐ Ingestion  
☒ Contact ☐ Direct Penetration

Team Member(s) Allergic: ☐ Yes ☒ No  
 Immunization required: ☐ Yes ☒ No

## ☒ Animals (FLD 43)

Location/Task No(s).: Site/ All Tasks

Source: ☐ Known ☒ Suspect  
 Route of Exposure: ☐ Inhalation ☐ Ingestion  
☒ Contact ☐ Direct Penetration

Team Member(s) Allergic: ☐ Yes ☒ No  
 Immunization required: ☐ Yes ☒ No

FLD 43 — WESTON Biohazard Field Operating Procedures: Att. OP ☐

## ☒ Sewage

Location/Task No(s).:

Source: ☐ Known ☒ Suspect  
 Route of Exposure: ☒ Inhalation ☒ Ingestion  
☒ Contact ☐ Direct Penetration

Team Member(s) Allergic: ☐ Yes ☒ No  
 Immunization required: ☐ Yes ☒ No

Tetanus Vaccination within Past 10 yrs: ☐ Yes ☐ No

## ☐ Etiologic Agents (List)

Location/Task No(s).: Site/ All Tasks

Source: ☐ Known ☐ Suspect  
 Route of Exposure: ☐ Inhalation ☐ Ingestion  
☐ Contact ☐ Direct Penetration

Team Member(s) Allergic: ☐ Yes ☐ No  
 Immunization required: ☐ Yes ☐ No

FLD 44 — WESTON Bloodborne Pathogens Exposure Control Plan – First Aid Procedures: Att. OP ☐

FLD 45 — WESTON Bloodborne Pathogens Exposure Control Plan – Working with Infectious Waste: Att. OP ☐

# HEALTH AND SAFETY EVALUATION 4 PHYSICAL HAZARDS OF CONCERN FORM 7

Phy. Haz. Cond.	Physical Hazard	Attach OP	WESTON OP Titles
Loud noise	Hearing loss/disruption of communication	<input checked="" type="checkbox"/>	FLD01 - Noise Protection
Inclement weather	Rain/humidity/cold/ice/snow/lightning	<input checked="" type="checkbox"/>	FLD02 - Inclement Weather
Steam heat stress	Burns/displaced oxygen/we: working surfaces	<input type="checkbox"/>	FLD03 - Hot Process - Steam
Heat stress	Burns/hot surfaces/low pressure steam	<input type="checkbox"/>	FLD04 - Hot Process - LT3
Ambient heat stress	Heat rash/cramps/exhaustion/heat stroke	<input checked="" type="checkbox"/>	FLD05 - Heat Stress Prevention/Monitoring
Cold stress	Hypothermia/frostbite	<input checked="" type="checkbox"/>	FLD06 - Cold Stress
Cold/wet	Trench/paddy/immersion foot/edema	<input checked="" type="checkbox"/>	FLD07 - Wet Feet
Confined spaces	Falls/burns/drowning/engulfment/electrocution	<input type="checkbox"/>	FLD08 - Confined Space Entry
Explosive vapors	Thermal burns/impaction/dismemberment	<input type="checkbox"/>	FLD09 - Hot Work
Improper lifting	Back strain/abdomen/arm/leg muscle/joint injury	<input checked="" type="checkbox"/>	FLD10 - Manual Lifting/Handling Heavy Objects
Uneven surfaces	Vehicle accidents/slips/trips/falls	<input checked="" type="checkbox"/>	FLD11 - Rough Terrain
Poor housekeeping	Slips/trips/falls/punctures/cuts/fires	<input checked="" type="checkbox"/>	FLD12 - Housekeeping
Structural integrity	Crushing/overhead hazards/compromised floors	<input type="checkbox"/>	FLD13 - Structural Integrity
Hostile persons	Bodily injury	<input checked="" type="checkbox"/>	FLD14 - Site Security
Remote area	Slips/trips/falls/back strain/communication	<input type="checkbox"/>	FLD15 - Remote Area
Improper cyl. handling	Mechanical injury/fire/explosion/suffocation	<input type="checkbox"/>	FLD16 - Pressure Systems - Compressed Gases
Water hazards	Poor visibility/entanglement/drowning/cold stress	<input type="checkbox"/>	FLD17 - Diving
Water hazards	Drowning/heat/cold stress/hypothermia/falls	<input type="checkbox"/>	FLD18 - Operation and Use of Boats
Water hazards	Drowning/frostbite/hypothermia/falls/electrocution	<input type="checkbox"/>	FLD19 - Working Over Water
Vehicle hazards	Struck by vehicle/collision	<input checked="" type="checkbox"/>	FLD20 - Traffic
Explosions	Explosion/fire/thermal burns	<input checked="" type="checkbox"/>	FLD21 - Explosives
Moving mechanical parts	Crushing/pinch points/overhead hazards/electrocution	<input checked="" type="checkbox"/>	FLD22 - Heavy Equipment Operation
Moving mech. parts	Overhead hazards/electrocution	<input type="checkbox"/>	FLD23 - Cranes/Lifting Equipment Operation
Working at elevation	Overhead hazards/falls/electrocution	<input type="checkbox"/>	FLD24 - Aerial Lifts/Manlifts
Working at elevation	Overhead hazards/falls/electrocution	<input type="checkbox"/>	FLD25 - Working at Elevation
Working at elevation	Overhead hazards/falls/electrocution/slips	<input type="checkbox"/>	FLD26 - Ladders
Working at elevation	Slips/trips/falls/overhead hazards	<input type="checkbox"/>	FLD27 - Scaffolding
Trench cave-in	Crushing/falling/overhead hazards/suffocation	<input type="checkbox"/>	FLD28 - Excavating/Trenching
Improper material handling	Back injury/crushing from load shifts	<input type="checkbox"/>	FLD29 - Materials Handling
Physiochemical	Explosions/fires from oxidizing, flam./corr. material	<input type="checkbox"/>	FLD30 - Hazardous Materials Use/Storage
Physiochemical	Fire and explosion	<input type="checkbox"/>	FLD31 - Fire Prevention/Response Plan Required
Physiochemical	Fire	<input checked="" type="checkbox"/>	FLD32 - Fire Extinguishers Required
Structural integrity	Overhead/electrocution/slips/trips/falls/fire	<input type="checkbox"/>	FLD33 - Demolition
Electrical	Electrocution/shock/thermal burns	<input checked="" type="checkbox"/>	FLD34 - Utilities
Electrical	Electrocution/shock/thermal burns	<input type="checkbox"/>	FLD35 - Electrical Safety
Burns/fires	Heat stress/fires/burns	<input type="checkbox"/>	FLD36 - Welding/Cutting/Burning
Impact/thermal	Thermal burns/high pressure impaction/heat stress	<input checked="" type="checkbox"/>	FLD37 - High Pressure Washers
Impaction/electrical	Smashing body parts/pinching/cuts/electrocution	<input checked="" type="checkbox"/>	FLD38 - Hand and Power Tools
Poor visibility	Slips/trips/falls	<input type="checkbox"/>	FLD39 - Illumination
Fire/explosion	Burns/impaction	<input type="checkbox"/>	FLD40 - Storage Tank Removal/Decommissioning
Communications	Disruption of communications	<input checked="" type="checkbox"/>	FLD41 - Std. Hand/Emergency Signals
Energy/release	Unexpected release of energy	<input type="checkbox"/>	FLD42 - Lockout/Tagout
Logging/ground clearing/grubbing activities	Operations associated with felling/moving of trees/brush/logs	<input type="checkbox"/>	FLD47 - Clearing, Grubbing, and Logging Operations
Drilling hazards	Electrocution/overhead hazards/pinch points	<input checked="" type="checkbox"/>	1.6 - Drilling Safety Guide

**TASK-BY-TASK RISK ASSESSMENT FORM 8****TASK DESCRIPTION**

- 1) Geologic Investigation/ Groundwater, Soil Sampling
- 2) Oversight
- 3) Well Installation

**EQUIPMENT REQUIRED/USED**

**(Be specific, e.g., hand tools, heavy equipment, instruments, PPE)**

Geoprobe, Drill, hand auger, TVA 1000, Water Quality instrument, sampling containers, Level D PPE

**POTENTIAL HAZARDS/RISKS****Chemical**

☒ Hazard Present Risk Level: ☐ H ☒ M ☐ L

What justifies risk level?

Past results indicated TCE and PCE results ranging from 1 to 10 ppb (water) and 5-250 ppm (soil).

**Physical**

☒ Hazard Present Risk Level: ☐ H ☒ M ☐ L

What justifies risk level?

The ground water and soil investigation tools/drill can cause a potential physical hazard if not used properly.

Working in proximity to traffic may potentially cause a physical hazard

**Biological**

☒ Hazard Present Risk Level: ☐ H ☐ M ☒ L

What justifies risk level?

Work will be conducted outdoors, where animals or insects may be present.

**RADIOLOGICAL**

☐ Hazard Present Risk Level: ☐ H ☐ M ☒ L

What justifies risk level?

Site background does not indicate that radiation sources are present

**LEVELS OF PROTECTION/JUSTIFICATION**

Level D PPE will be used. Site history and previous investigations indicate that contamination levels are such that elevated levels of protection are not warranted. Should elevated constituent levels be encountered, PPE upgrades will be incorporated as necessary.

**SAFETY PROCEDURES REQUIRED AND/OR FIELD OPS UTILIZED**

WESTON FLD/ SOP on site at all times.

PERSONNEL PROTECTION PLAN FORM 9

## Engineering Controls

Describe Engineering Controls used as part of Personnel Protection Plan:

Task(s)
---------

1	N/A
2	N/A
3	N/A

### Administrative Controls

Describe Administrative Controls used as part of Personnel Protection Plan:

Task(s)
---------

1 Limit time in the Exclusion Zone. Take proper breaks. Enforce proper PPE usage. Traffic safety signs, cones  
and reflective vests will be used when working in proximity to traffic. The exclusion zone is defined as the  
area surrounding the working equipment that is equal or greater than 1.5 times the vertical limit of the  
equipment, or 10-feet from the equipment, whichever is greater. Smoking, eating, and drinking within the  
exclusion zone are prohibited.

2 Limit time in the Exclusion Zone. Take proper breaks. Enforce proper PPE usage. Traffic safety signs, cones  
and reflective vests will be used when working in proximity to traffic. The exclusion zone is defined as the  
area surrounding the working equipment that is equal or greater than 1.5 times the vertical limit of the  
equipment, or 10-feet from the equipment, whichever is greater. Smoking, eating, and drinking within the  
exclusion zone are prohibited.

3 Limit time in the Exclusion Zone. Take proper breaks. Enforce proper PPE usage. Traffic safety signs, cones  
and reflective vests will be used when working in proximity to traffic. The exclusion zone is defined as the  
area surrounding the working equipment that is equal or greater than 1.5 times the vertical limit of the  
equipment, or 10-feet from the equipment, whichever is greater. Smoking, eating, and drinking within the  
exclusion zone are prohibited.

Personal Protective Equipment	
1. Type of PPE required	
2. Condition of PPE	
3. Date of inspection	
4. Signature of inspector	
5. Signature of worker	

Action Levels for Changing Levels of Protection. Refer to HASP Form 13, Site Air Monitoring Program—Action Levels. Define Action Levels for up or down grade for each task:

Task(s)
---------

1	Level D
2	Level D
3	Level D

[illegible]

Level D	Level D Modified
---------	------------------

<b>Task(s):</b>	<b>Task(s):</b>
-----------------	-----------------

<input checked="" type="checkbox"/> Head	Hard Hat	<input type="checkbox"/> Head
<input checked="" type="checkbox"/> Eye and Face	Safety Glasses	<input type="checkbox"/> Eye and Face
<input checked="" type="checkbox"/> Hearing (Case by Case basis-SHSC)	Ear Plugs	<input type="checkbox"/> Hearing
<input type="checkbox"/> Arms and Legs Only		<input type="checkbox"/> Arms and Legs Only
<input type="checkbox"/> Appropriate Work Uniform		<input type="checkbox"/> Whole Body
<input checked="" type="checkbox"/> Hand - Gloves	Nitrile-Surgical	<input type="checkbox"/> Apron
<input checked="" type="checkbox"/> Foot	Safety Boots	<input type="checkbox"/> Hand - Gloves
<input type="checkbox"/> Fall Protection		<input type="checkbox"/> Gloves

Level D	Level D Modified
---------	------------------

<b>Task(s):</b>	<b>Task(s):</b>
-----------------	-----------------

<input checked="" type="checkbox"/> Head	Hard Hat	<input type="checkbox"/> Head
<input checked="" type="checkbox"/> Eye and Face	Safety Glasses	<input type="checkbox"/> Eye and Face
<input checked="" type="checkbox"/> Hearing (Case by Case basis-SHSC)	Ear Plugs	<input type="checkbox"/> Hearing
<input type="checkbox"/> Arms and Legs Only		<input type="checkbox"/> Arms and Legs Only
<input type="checkbox"/> Appropriate Work Uniform		<input type="checkbox"/> Whole Body
<input checked="" type="checkbox"/> Hand - Gloves	Nitrile-Surgical	<input type="checkbox"/> Apron
<input checked="" type="checkbox"/> Foot	Safety Boots	<input type="checkbox"/> Hand - Gloves
<input type="checkbox"/> Fall Protection		<input type="checkbox"/> Gloves

<input type="checkbox"/> Waiters <input checked="" type="checkbox"/> Other (Depending on work location-SHSC)      Reflective Vest	<input type="checkbox"/> Gloves <input type="checkbox"/> Foot - Safety Boots <input type="checkbox"/> Over Boots
--	--

DESCRIPTION OF LEVELS OF PROTECTION-FORM 10	
Level C	Level B
<b>Task(s):</b> <input checked="" type="checkbox"/> Head                                      Hard Hat <input checked="" type="checkbox"/> Eye and Face                                  Safety Glasses <input checked="" type="checkbox"/> Hearing (Case by Case basis-SHSC) <input type="checkbox"/> Arms and Legs Only <input checked="" type="checkbox"/> Whole Body                                      Tyvek Coveralls <input type="checkbox"/> Apron <input checked="" type="checkbox"/> Hand - Gloves                                  Nitrile-Surgical <input type="checkbox"/> Gloves <input type="checkbox"/> Gloves <input checked="" type="checkbox"/> Foot - Safety Boots                              Safety Boots <input checked="" type="checkbox"/> Outer Boots                                      Disposable Booties <input type="checkbox"/> Boots (Other) <hr/> <input type="checkbox"/> Half Face <input type="checkbox"/> Cart./Canister <input checked="" type="checkbox"/> Full Face    User Specific Respirator <input checked="" type="checkbox"/> Cart./Canister                                      GMCHP100 <input type="checkbox"/> PAPR <input type="checkbox"/> Cart./Canister <input type="checkbox"/> Type C <input type="checkbox"/> Fall Protection <input type="checkbox"/> Flotation <input checked="" type="checkbox"/> Other    Reflective Vest	<b>Task(s):</b> <input type="checkbox"/> Head <input type="checkbox"/> Eye and Face <input type="checkbox"/> Hearing <input type="checkbox"/> Arms and Legs Only <input type="checkbox"/> Whole Body <input type="checkbox"/> Apron <input type="checkbox"/> Hand - Gloves <input type="checkbox"/> Gloves <input type="checkbox"/> Gloves <input type="checkbox"/> Foot - Safety Boots <input type="checkbox"/> Outer Boots <input type="checkbox"/> Boots (Other) <hr/> <input type="checkbox"/> SAR - Airline <input type="checkbox"/> SCBA <input type="checkbox"/> Comb. Airline/SCBA <input type="checkbox"/> Cascade System <input type="checkbox"/> Compressor <input type="checkbox"/> Fall Protection <input type="checkbox"/> Flotation <input type="checkbox"/> Other

# SITE OR PROJECT HAZARD MONITORING PROGRAM-FORM 11

## Air Monitoring Instruments

### Instrument Selection and Initial Check Record

Reporting Format: ☒ Field Notebook ☐ Field Data Sheets\* ☐ Air Monitoring Log ☐ Trip Report ☐ Other

Instrument	Task No.(s)	Number Required	Number Received	Checked Upon Receipt	Comment	Initials
<input type="checkbox"/> CGI				<input type="checkbox"/>		
<input type="checkbox"/> O <sub>2</sub>				<input type="checkbox"/>		
<input type="checkbox"/> CGI/O <sub>2</sub>				<input type="checkbox"/>		
<input type="checkbox"/> CGI/O <sub>2</sub> /tox-PPM, H <sub>2</sub> S,H <sub>2</sub> S/CO				<input type="checkbox"/>		
<input type="checkbox"/> RAD				<input type="checkbox"/>		
<input type="checkbox"/> GM (Pancake)				<input type="checkbox"/>		
<input type="checkbox"/> NaI (Micro R)				<input type="checkbox"/>		
<input type="checkbox"/> ZnS (Alpha Scintillator)				<input type="checkbox"/>		
<input type="checkbox"/> Other _____				<input type="checkbox"/>		
<input type="checkbox"/> PID				<input type="checkbox"/>		
<input type="checkbox"/> HNu 10.2				<input type="checkbox"/>		
<input type="checkbox"/> HNu 11.7				<input type="checkbox"/>		
<input type="checkbox"/> Photovac, TMA				<input type="checkbox"/>		
<input type="checkbox"/> OVM				<input type="checkbox"/>		
<input type="checkbox"/> Other _____				<input type="checkbox"/>		
<input type="checkbox"/> FID				<input type="checkbox"/>		
<input type="checkbox"/> Fox 128				<input type="checkbox"/>		
<input type="checkbox"/> Heath, AID, Other				<input type="checkbox"/>		
<input type="checkbox"/> RAM, Mini-RAM, Other _____				<input type="checkbox"/>		
<input type="checkbox"/> Monitox				<input type="checkbox"/>		
Specify: _____				<input type="checkbox"/>		
<input type="checkbox"/> Personal Sampling				<input type="checkbox"/>		
Specify: _____				<input type="checkbox"/>		
<input type="checkbox"/> Bio-Aerosol Monitor				<input type="checkbox"/>		
<input type="checkbox"/> Pump - MSA, Dräger, Sensidyne				<input type="checkbox"/>		
<input type="checkbox"/> Tubes/type: _____				<input type="checkbox"/>		
<input type="checkbox"/> Tubes/type: _____				<input type="checkbox"/>		
<input checked="" type="checkbox"/> Other: TVA 1000 (FID/PID)	1, 2, 3			<input type="checkbox"/>		



# SITE OR PROJECT HAZARD MONITORING PROGRAM FORM 12

## Air Monitoring Instruments Calibration Record

[illegible]

# SITE AIR MONITORING PROGRAM-FORM 13

Action Levels	
---------------	--

These Action Levels, if not defined by regulation, are some percent (usually 50%) of the applicable PEL/TLV/REL. That number must also be adjusted to account for instrument response factors.

	Tasks	Action Level		Action
<input type="checkbox"/> Explosive atmosphere		Ambient Air Concentration	Confined Space Concentration	
		<10% LEL  10 to 25% LEL  >25% LEL	0 to 1% LEL  1 to 10% LEL  >10% LEL	Work may continue. Consider toxicity potential.  Work may continue. Increase monitoring frequency.  Work must stop. Ventilate area before returning.
<input type="checkbox"/> Oxygen		Ambient Air Concentration	Confined Space Concentration	
		<19.5% O <sub>2</sub>  19.5% to 25% O <sub>2</sub>  >25% O <sub>2</sub>	<19.5% O <sub>2</sub>  19.5% to 23.5% O <sub>2</sub>  >23.5% O <sub>2</sub>	Leave area. Re-enter only with self-contained breathing apparatus.  Work may continue. Investigate changes from 21%.  Work must stop. Ventilate area before returning.
<input type="checkbox"/> Radiation		< 3 times background 3 times background to < 1 mR/hour            > 1 mrem/hour		Continue work. Radiation above background levels (normally 0.01-0.02 mR/hr) signifies possible radiation source(s) present. Continue investigation with caution. Perform thorough monitoring. Consult with a Health Physicist.  Potential radiation hazard. Evacuate site. Continue investigation only upon the advice of Health Physicist.
<input checked="" type="checkbox"/> Organic gases and vapors	1, 2	Level D <50 ppm Level C 50-100 ppm (PEL 100ppm/ WESTON Action Level ½ PEL/TLV)		Continue work Work must stop.
<input type="checkbox"/> Inorganic gases, vapors, and particulates				

# CONTINGENCIES FORM 14

## Emergency Contacts and Phone Numbers

Agency	Contact	Phone Number
Local Medical Emergency Facility (LMF)	Advocate Good Samaritan Hospital	(630) 275-5900
WESTON Medical Emergency Contact	EMR - Dr. Elyane Theriault	1-800-229-3674
WESTON Health and Safety	Corporate Health and Safety Dan Leskovec/ Safety Div Manager	(610) 701-3000 (847) 918-4069
Fire Department	911	911
Police Department	911	911
On-Site Coordinator- SHSC	Barry Crawford	847/ 962-0655
Client Site Contact		
Site Telephone	Barry Crawford	847/ 962-0655
Nearest Telephone	Barry Crawford	847/ 962-0655

## Local Medical Emergency Facility(s)

**Name of Hospital:** Advocate Good Samaritan Hospital

**Address:** 3815 Highland Avenue Downers Grove, IL

**Phone No** 630.275.5900

### Type of Service:

- ☐ Physical trauma only  
☐ Chemical exposure only  
☒ Physical trauma and chemical exposure  
☒ Available 24 hours

### Route to Hospital (written detail):

Left on Belmont. Right on Ogden. Left on Main (Main Street becomes Highland Ave.) See next page for map.

### Travel time from site:

8 min.

### Distance to hospital:

3.4

The hospital route map will be posted in WESTON vehicles. Additionally, route maps will be given to each individual onsite.

<b>Form 15 – Route to Hospital (Map)</b>
--

Please insert a map with the route to the nearest hospital here.



[Yahoo! - Yellow Pages - Help](#)  
 Powered by Mapquest.com (tm)

Get The New  
 York Times  
 delivered right to  
 your door

Getting the credit you deserve?



Welcome, Guest User

[Create My Locations - Sign In](#)

## Yahoo! Maps - Driving Directions

Starting from: 2500 Curtiss, Downers Grove, IL 60515-4058

Arriving at: ★ 3815 Highland, Downers Grove, IL 60515-1500

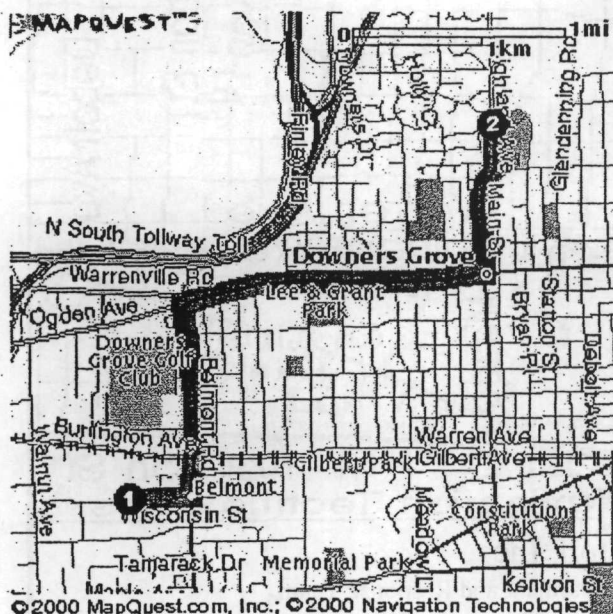
Distance: 3.4 miles

Approximate Travel Time: 8 mins

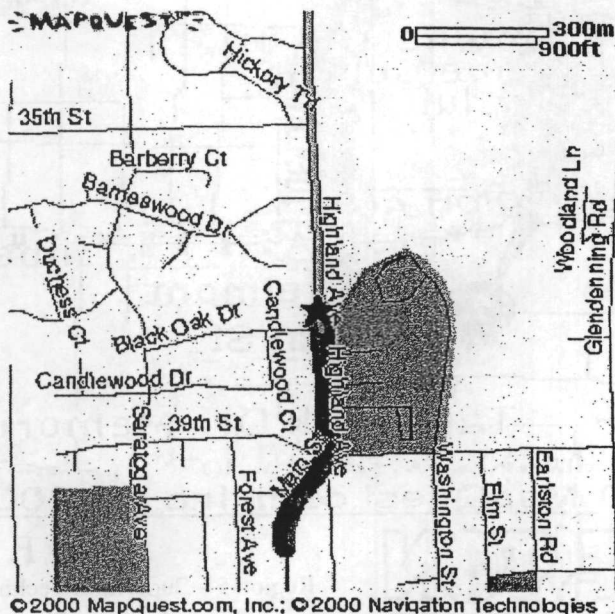
[Email Directions](#)

[Get Reverse Directions](#)

[Text Only Driving Directions](#)



Full Route

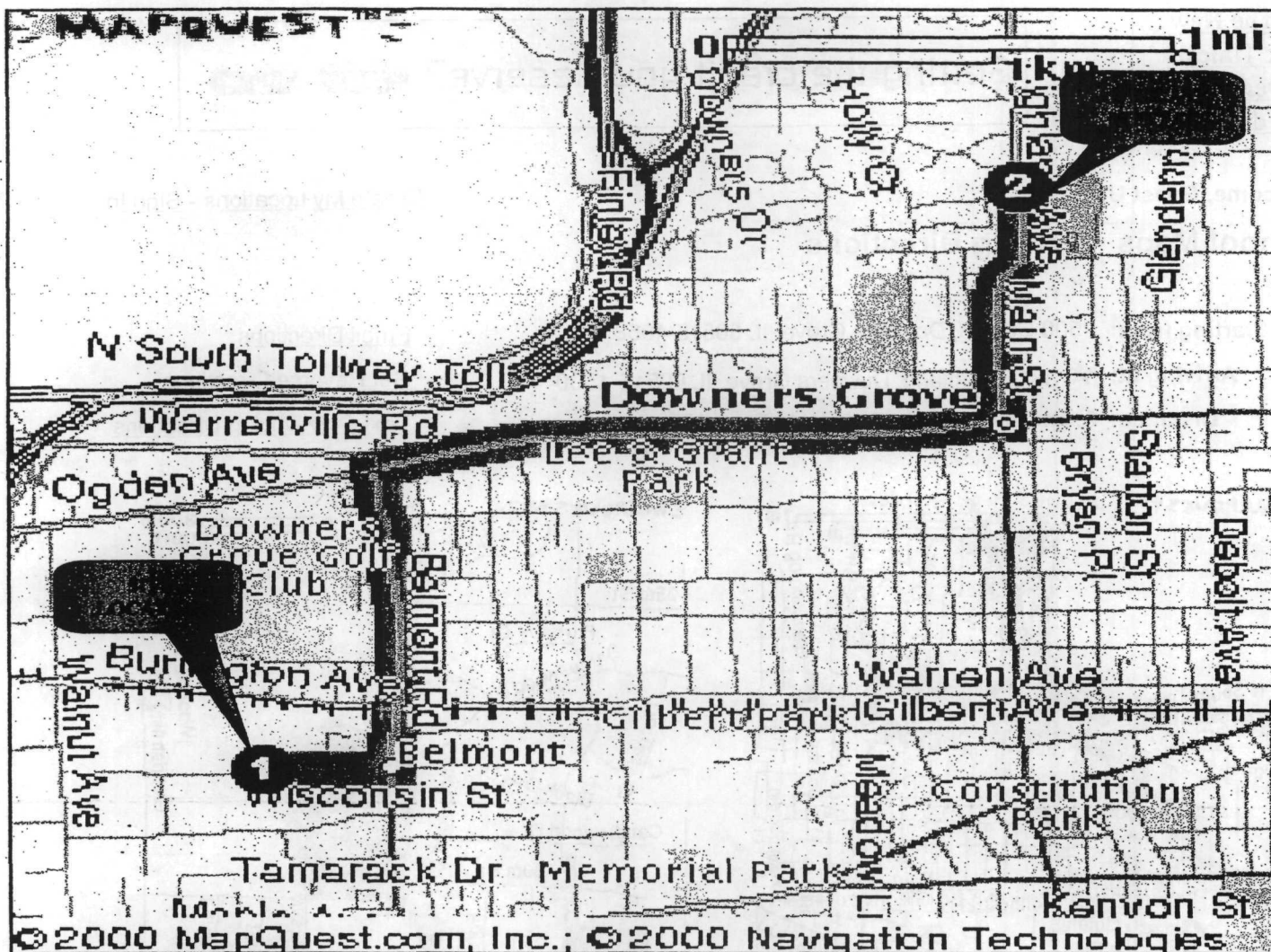


Destination

### Directions

	Miles
1. Start out going East on CURTISS ST towards CHASE AVE by turning left.	0.3
2. Turn LEFT onto BELMONT RD.	1.0
3. Turn RIGHT onto OGDEN AVE/US-34.	1.4
4. Turn LEFT onto MAIN ST.	0.5
5. MAIN ST becomes HIGHLAND AVE.	0.2

When using any driving directions or map, it's a good idea to do a reality check and make sure the road still exists, watch out for construction, and follow all traffic safety precautions. This is only to be used as an aid in planning.



Roy F. Weston, Inc.

Region 5 – Superfund Technical Assessment and Response Team  
3 First National Plaza, Suite 1990, Chicago IL 60602

Title:  
Hospital Map

Figure:  
1

Site:  
Downers Grove Site

Scale: NOT TO SCALE

City:  
Downers Grove

State:  
Illinois

Date:  
1/15/01

## CONTINGENCIES FORM 16

### Response Plans

<b>Medical - General</b>  Provide first aid, if trained; assess and determine need for further medical assistance.  Transport or arrange for transport after appropriate decontamination.	First Aid Kit: YES	Type A	Location Vehicle	Special First-Aid Procedures: Cyanides on-site <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes, contact LMF. Do they have antidote kit? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
	Eyewash required <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Type Eye wash solution bottle	Location Vehicle	<b>HF</b> on-site <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes, need neutralizing ointment for first-aid kit. Contact LMF.
	Shower required <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Type	Location	

Plan for Response to Spill/Release	Plan for Response to Fire/Explosion	Fire Extinguishers YES
In the event of a spill or release, ensure safety, assess situation, and perform containment and control measures, as appropriate.	In the event of a fire or explosion, ensure personal safety, assess situation, and perform containment and control measures, as appropriate:	Type/Location <u>ABC/near work area</u> / / / / / /
a. Cleanup per MSDSs if small; or sound alarm, call for assistance, notify Emergency Coordinator b. Evacuate to pre-determined safe place c. Account for personnel d. Determine if team can respond safely e. Mobilize per Site Spill Response Plan	a. Sound alarm and call for assistance, notify Emergency Coordinator b. Evacuate to predetermined safe place c. Account for personnel d. Use fire extinguisher <u>only if safe and trained</u> in its use e. Stand by to inform emergency responders of materials and conditions	

Description of Spill Response Gear	Location	Description (Other Fire Response Equipment)	Location
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

<b>Plan to Respond to Security Problems</b> Report problems to Downers Grove Police Department and WESTON PM	

## DECONTAMINATION PLAN-FORM 17

### Personnel Decontamination

Consistent with the levels of protection required, step-by-step procedures for personnel decontamination for each level of protection are attached.

### Levels of Protection Required for Decontamination Personnel

The levels of protection required for personnel assisting with decontamination will be:

☐ Level B

☐ Level C

☒ Level D

Modifications include:

Reflective vest worn for work occurring adjacent to roadway and parking lots.

### Disposition of Decontamination Wastes

Provide a description of waste disposition, including identification of storage area, hauler, and final disposal site, if applicable:

If contamination is not detected, the material will be considered non-hazards and discarded as such. If the material is determined to be hazardous waste the material will be labeled as such & disposed of according to federal regulations utilizing a licensed hazardous waste disposal facility and waste hauler

### Equipment Decontamination

A procedure for decontamination steps required for non-sampling equipment and heavy machinery follows:

All non-disposable drilling (e.g. rods) equipment that comes into contact with site soils, sediments, and surface water will either be steam cleaned or gross decontaminated with distilled-water and brush, washed with Alconox solution and rinsed with distilled water. Rinse water will be collected in a sump area constructed within the decontamination pad. The sump area will be pumped into 55-gallon drums, then sampled and removed from site according to federal regulations.

### Sampling Equipment Decontamination

Sampling equipment will be decontaminated in accordance with the following procedure:

All non-disposable sampling equipment that comes into contact with site soils, sediments, and surface water will either be steam cleaned or gross decontaminated with distilled-water and brush, washed with Alconox solution and rinsed with distilled water. The solution will be collected in 5-gallon buckets with detachable lids. The buckets will be emptied into 55-gallon drums located at the decontamination pad and storage area. The drums will be sampled and removed from site according to federal regulations.

**LEVEL D/MODIFIED LEVEL D DECONTAMINATION PLAN FORM 18**

Check indicated functions or add steps, as necessary:

**Function****Description of Process, Solution, and Container**☐ Segregated equipment drop☐ Boot cover and glove wash☐ Boot cover and glove rinse☐ Hip Waiters☒ Boot cover removal

Remove and dispose in designated bag.

☒ Outer glove removal

Remove and dispose in designated bag.

**HOTLINE**☐ Suit/safety boot wash☐ Suit/boot/glove rinse☐ Safety boot removal☐ Suit removal☐ Inner glove wash☐ Inner glove rinse☐ Inner glove removal☐ Inner clothing removal**CONTAMINATION REDUCTION ZONE (CRZ)/SAFE ZONE BOUNDARY**☐ Field wash☐ Redress**Disposal Plan, End of Day:**

All used disposable PPE and disposal site material (boots, gloves, paper towels etc..) will be properly contained, drummed, and left on site to be disposed of at the discretion of the U.S. EPA OSC. At the end of investigation at each facility, the drums containing IDW will be transferred in a central location for disposal at the end of project.

**Disposal Plan, End of Week:**

All used disposable PPE and disposal site material (boots, gloves, paper towels etc..) will be properly contained, drummed, and left on site to be disposed of at the discretion of the U.S. EPA OSC. At the end of investigation at each facility, the drums containing IDW will be transferred in a central location for disposal at the end of project.

**Disposal Plan, End of Project:**

All used disposable PPE and disposal site material (boots, gloves, paper towels etc..) will be properly contained, drummed, and left on site to be disposed of at the discretion of the U.S. EPA OSC. At the end of investigation at each facility, the drums containing IDW will be transferred in a central location for disposal at the end of project.

# SITE PERSONNEL AND CERTIFICATION STATUS-FORM 21

## WESTON

<b>Name:</b> Barry Crawford <b>Title:</b> Geoscientist II/SHSC <b>Task(s):</b> 1,2,3 <b>Certification Level or Description:</b> <input checked="" type="checkbox"/> Medical Current <input checked="" type="checkbox"/> Training Current <input checked="" type="checkbox"/> Fit Test Current (Qual.) <input type="checkbox"/> Fit Test Current (Quant.)	<b>Name:</b> Yoshie Hagiwara <b>Title:</b> Geoscientist II <b>Task(s):</b> 1,2,3 <b>Certification Level or Description:</b> <input checked="" type="checkbox"/> Medical Current <input checked="" type="checkbox"/> Training Current <input checked="" type="checkbox"/> Fit Test Current (Qual.) <input type="checkbox"/> Fit Test Current (Quant.)
<b>Name:</b> Kurt Fischer <b>Title:</b> Project Manager <b>Task(s):</b> 1,2,3 <b>Certification Level or Description:</b> <input checked="" type="checkbox"/> Medical Current <input checked="" type="checkbox"/> Training Current <input type="checkbox"/> Fit Test Current (Qual.) <input type="checkbox"/> Fit Test Current (Quant.)	<b>Name:</b> Ben Maradkel <b>Title:</b> Scientist II <b>Task(s):</b> 1,2,3 <b>Certification Level or Description:</b> <input checked="" type="checkbox"/> Medical Current <input checked="" type="checkbox"/> Training Current <input checked="" type="checkbox"/> Fit Test Current (Qual.) <input type="checkbox"/> Fit Test Current (Quant.)
<b>Name:</b> <b>Title:</b> <b>Task(s):</b> <b>Certification Level or Description:</b> <input type="checkbox"/> Medical Current <input type="checkbox"/> Training Current <input type="checkbox"/> Fit Test Current (Qual.) <input type="checkbox"/> Fit Test Current (Quant.)	<b>Name:</b> <b>Title:</b> <b>Task(s):</b> <b>Certification Level or Description:</b> <input type="checkbox"/> Medical Current <input type="checkbox"/> Training Current <input type="checkbox"/> Fit Test Current (Qual.) <input type="checkbox"/> Fit Test Current (Quant.)
<b>Name:</b> <b>Title:</b> <b>Task(s):</b> <b>Certification Level or Description:</b> <input type="checkbox"/> Medical Current <input type="checkbox"/> Training Current <input type="checkbox"/> Fit Test Current (Qual.) <input type="checkbox"/> Fit Test Current (Quant.)	<b>Name:</b> <b>Title:</b> <b>Task(s):</b> <b>Certification Level or Description:</b> <input type="checkbox"/> Medical Current <input type="checkbox"/> Training Current <input type="checkbox"/> Fit Test Current (Qual.) <input type="checkbox"/> Fit Test Current (Quant.)
<b>Name:</b> <b>Title:</b> <b>Task(s):</b> <b>Certification Level or Description:</b> <input type="checkbox"/> Medical Current <input type="checkbox"/> Training Current <input type="checkbox"/> Fit Test Current (Qual.) <input type="checkbox"/> Fit Test Current (Quant.)	<b>Name:</b> <b>Title:</b> <b>Task(s):</b> <b>Certification Level or Description:</b> <input type="checkbox"/> Medical Current <input type="checkbox"/> Training Current <input type="checkbox"/> Fit Test Current (Qual.) <input type="checkbox"/> Fit Test Current (Quant.)
<b>Name:</b> <b>Title:</b> <b>Task(s):</b> <b>Certification Level or Description:</b> <input type="checkbox"/> Medical Current <input type="checkbox"/> Training Current <input type="checkbox"/> Fit Test Current (Qual.) <input type="checkbox"/> Fit Test Current (Quant.)	<b>Name:</b> <b>Title:</b> <b>Task(s):</b> <b>Certification Level or Description:</b> <input type="checkbox"/> Medical Current <input type="checkbox"/> Training Current <input type="checkbox"/> Fit Test Current (Qual.) <input type="checkbox"/> Fit Test Current (Quant.)

**TRAINING CURRENT - Training:** All personnel, including visitors, entering the exclusion or contamination reduction zones must have certifications of completion of training in accordance with OSHA 29 CFR 1910, 29 CFR 1926, or 29 CFR 1910.120.

**FIT TEST CURRENT - Respirator Fit Testing:** All persons, including visitors, entering any area requiring the use or potential use of any negative pressure respirator must have had, as a minimum, a qualitative fit test, administered in accordance with OSHA 29 CFR 1910.134 or ANSI, within the last 12 months. If site conditions require the use of a full-face, negative-pressure, air-purifying respirator for protection from asbestos or lead, employees must have had a qualitative fit test, administered according to OSHA 29 CFR 1910.1001 or 1025/1926, within the last 6 months.

**MEDICAL CURRENT - Medical Monitoring Requirements:** All personnel, including visitors, entering the exclusion or contamination reduction zones must be certified as medically fit to work and to wear a respirator, if appropriate, in accordance with 29 CFR 1910, 29 CFR 1926/1910, or 29 CFR 1910.120.

The Site Health and Safety Coordinator is responsible for verifying all certifications and fit tests.

## SITE PERSONNEL AND CERTIFICATION STATUS-FORM 22

### Subcontractor's Health and Safety Program Evaluation

Name of Subcontractor: TBD  
Address:

Activities To Be Conducted by Subcontractor: Drilling, well installation

#### Evaluation Criteria

Medical program meets OSHA/WESTON criteria

- ☐ Acceptable  
☐ Unacceptable

Comments:

Personal protective equipment available

- ☐ Acceptable  
☐ Unacceptable

Comments:

On-site monitoring equipment available, calibrated, and operated properly

- ☐ Acceptable  
☐ Unacceptable

Comments:

Safe working procedures clearly specified

- ☐ Acceptable  
☐ Unacceptable

Comments:

Training meets OSHA/WESTON criteria

- ☐ Acceptable  
☐ Unacceptable

Comments:

Emergency procedures

- ☐ Acceptable  
☐ Unacceptable

Comments:

Decontamination procedures

- ☐ Acceptable  
☐ Unacceptable

Comments:

General health and safety program evaluation

- ☐ Acceptable  
☐ Unacceptable

Comments:

Additional comments:

- ☐ Subcontractor has agreed to and will conform with the WESTON HASP for this project.  
  
☐ Subcontractor will work under his own HASP, which has been accepted by project PM.

Evaluation Conducted by:

Date:

#### Subcontractor

Name: TBD

Title:

Task(s):

Certification Level or Description:

- ☐ Medical Current ☐ Training Current  
☐ Fit Test Current (Qual.) ☐ Fit Test Current (Quant.)

Name: TBD

Title:

Task(s):

Certification Level or Description:

- ☐ Medical Current ☐ Training Current  
☐ Fit Test Current (Qual.) ☐ Fit Test Current (Quant.)

Name: TBD

Title:

Task(s):

Certification Level or Description:

- ☐ Medical Current ☐ Training Current  
☐ Fit Test Current (Qual.) ☐ Fit Test Current (Quant.)

Name:

Title:

Task(s):

Certification Level or Description:

- ☐ Medical Current ☐ Training Current  
☐ Fit Test Current (Qual.) ☐ Fit Test Current (Quant.)

Name:

Title:

Task(s):

Certification Level or Description:

- ☐ Medical Current ☐ Training Current  
☐ Fit Test Current (Qual.) ☐ Fit Test Current (Quant.)

Name:

Title:

Task(s):

Certification Level or Description:

- ☐ Medical Current ☐ Training Current  
☐ Fit Test Current (Qual.) ☐ Fit Test Current (Quant.)

## HEALTH AND SAFETY PLAN APPROVAL/SIGNOFF FORM-FORM 28

**Site Name:** Ellsworth Industrial Park Site

WO#: 20064.155.100.0132
-------------------------

**Address:** Ellsworth Industrial Park Site  
Downers Grove, IL

I understand, agree to, and will conform with the information set forth in this Health and Safety Plan (and attachments) and discussed in the personnel health and safety briefing(s).

**Date**[illegible]

## TRAINING AND BRIEFING TOPICS FORM 24

The following items will be covered at the site-specific training meeting, daily or periodically.

<input type="checkbox"/> Site characterization and analysis, Sec. 3.0, 29 CFR 1910.120 I	<input type="checkbox"/> Level A
<input checked="" type="checkbox"/> Physical hazards, HASP Form 07	<input type="checkbox"/> Level B
<input checked="" type="checkbox"/> Chemical hazards, HASP Form 04	<input checked="" type="checkbox"/> Level C
<input checked="" type="checkbox"/> Animal bites, stings, and poisonous plants	<input checked="" type="checkbox"/> Level D
<input type="checkbox"/> Etiologic (infectious) agents	<input checked="" type="checkbox"/> Monitoring, 29 CFR 1910.120 (h)
<input checked="" type="checkbox"/> Site control, 29 CFR 1910.120 d	<input checked="" type="checkbox"/> Decontamination, 29 CFR 1910.120 (k)
<input type="checkbox"/> Engineering controls and work practices, 29 CFR 1910.120 (g)	<input type="checkbox"/> Emergency response, 29 CFR 1910.120 (l)
<input checked="" type="checkbox"/> Heavy machinery	<input checked="" type="checkbox"/> Elements of an emergency response, 29 CFR 1910.120 (l)
<input type="checkbox"/> Forklift	<input type="checkbox"/> Procedures for handling site emergency incidents, 29 CFR 1910.120 (l)
<input type="checkbox"/> Backhoe	<input type="checkbox"/> Off-site emergency response, 29 CFR 1910.120 (l)
<input checked="" type="checkbox"/> Equipment	<input type="checkbox"/> Handling drums and containers, 29 CFR 1910.120 (j)
<input type="checkbox"/> Tools	<input type="checkbox"/> Opening drums and containers
<input type="checkbox"/> Ladder, 29 CFR 1910.27 (d)/29 CFR 1926	<input type="checkbox"/> Electrical material handling equipment
<input checked="" type="checkbox"/> Overhead and underground utilities	<input type="checkbox"/> Radioactive waste
<input type="checkbox"/> Scaffolds	<input type="checkbox"/> Shock-sensitive waste
<input type="checkbox"/> Structural integrity	<input type="checkbox"/> Laboratory waste packs
<input type="checkbox"/> Unguarded openings - wall, floor, ceilings	<input type="checkbox"/> Sampling drums and containers
<input type="checkbox"/> Pressurized air cylinders	<input type="checkbox"/> Shipping and transport, 49 CFR 172.101, IATA
<input checked="" type="checkbox"/> Personal protective equipment, 29 CFR 1910.120 (g); 29 CFR 1910.134	<input type="checkbox"/> Tank and vault procedures
<input checked="" type="checkbox"/> Respiratory protection, 29 CFR 1910.120 (g); ANSI Z88.2	<input type="checkbox"/> Illumination, 29 CFR 1910.120 (m)
<input type="checkbox"/>	<input type="checkbox"/> Sanitation, 29 CFR 1910.120 (n)
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>

# HEALTH AND SAFETY EVALUATION- 1 CHEMICAL HAZARDS-FORM 25

Hazardous Substance/Tasks	Physical Properties	Normal Physical State	State At Site/Proj. Temp.	Characteristics	Exposure Limits	Route(s) of Exposure/Symptoms	Monitoring Instruments/Ionization Potential + % Response
	<input type="checkbox"/> Explosive <input type="checkbox"/> Flammable <input type="checkbox"/> Corrosive <input type="checkbox"/> Reactive <input type="checkbox"/> Water Reactive  <input type="checkbox"/> Oxidizer	<input type="checkbox"/> Solid <input type="checkbox"/> Liquid <input type="checkbox"/> Gas	<input type="checkbox"/> Solid <input type="checkbox"/> Liquid <input type="checkbox"/> Gas	pH: _____ FP: _____ LEL: _____ UEL: _____ Auto. Ig.: _____ BP: _____	<input type="checkbox"/> CA _____ <input type="checkbox"/> PEL _____ <input type="checkbox"/> TLV _____ <input type="checkbox"/> IDLH _____ <input type="checkbox"/> Only toxicological data available <input type="checkbox"/> Other: _____	<input type="checkbox"/> Inhalation <input type="checkbox"/> Ingestion <input type="checkbox"/> Skin Absorption <input type="checkbox"/> Contact <input type="checkbox"/> Direct Penetration  <input type="checkbox"/> Other: _____	<input type="checkbox"/> HNu <input type="checkbox"/> 11.7 eV <input type="checkbox"/> 10.2 eV <input type="checkbox"/> OVM <input type="checkbox"/> 10.0/10.6 eV <input type="checkbox"/> 11.8 eV <input type="checkbox"/> CGI <input type="checkbox"/> OVA <input type="checkbox"/> _____
CAS No:	<input type="checkbox"/> Radioactive <input type="checkbox"/> Other	Incompatible With:		MP: _____			
Synonyms:				Sp. Gr.: _____			
				Vap. D.: _____			
				Vap. P.: _____			
				H <sub>2</sub> O Sol.: _____			
				Other: _____			
						Symptoms:	IP:
							% Response:

**ATTACHMENT A**

**CHEMICAL CONTAMINANTS DATA SHEETS**

**(Attach the appropriate data sheets from NIOSH Pocket Guide to Chemical Hazards)**

# NIOSH Pocket Guide to Chemical Hazards

Trichloroethylene		CAS 79-01-6	
CH=CCl <sub>2</sub>		RTECS KX4550000	
Synonyms & Trade Names ethylene trichloride, TCE, Trichloroethene, Trilene		DOT ID & Guide 1710 160	
Exposure Limits	NIOSH REL: Ca See Appendix A See Appendix C		
	OSHA PEL†: TWA 100 ppm C 200 ppm 300 ppm (5-minute maximum peak in any 2 hours)		
DLH Ca [1000 ppm] See: 79016		Conversion 1 ppm = 5.37 mg/m <sup>3</sup>	
Physical Description colorless liquid (unless dyed blue) with a chloroform-like odor.			
MW: 131.4	BP: 189°F	FRZ: -99°F	Sol(77°F): 0.1%
TP: 58 mmHg	IP: 9.45 eV		Sp.Gr: 1.46
Fl.P: ?	UEL(77°F): 10.5%	LEL(77°F): 8%	
Combustible Liquid, but burns with difficulty.			
Incompatibilities & Reactivities Strong caustics & alkalis; chemically-active metals (such as barium, lithium, sodium, magnesium, titanium & zirconium)			
Measurement Methods NIOSH 1022, 3800; OSHA 1001 See: NMAM or OSHA Methods			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation Provide: Eyewash, Quick drench		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately	
Respirator Recommendations NIOSH At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus			
Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact			
Symptoms Irritation eyes, skin; headache, visual disturbance, lassitude (weakness, exhaustion), dizziness, tremor, nervousness, nausea, vomiting; dermatitis; cardiac arrhythmias, paresthesia; liver injury; [potential occupational carcinogen]			
Target Organs Eyes, skin, respiratory system, heart, liver, kidneys, central nervous system			

# NIOSH Pocket Guide to Chemical Hazards

<b>Tetrachloroethylene</b>		CAS 127-18-4
$\text{Cl}_2\text{C}=\text{CCl}_2$		RTECS <u>KX3850000</u>
<b>Synonyms &amp; Trade Names</b> Perchloroethylene, Perchloroethylene, Perk, Tetrachlorethylene		<b>DOT ID &amp; Guide</b> 1897 <u>160</u>
<b>Exposure Limits</b>	NIOSH REL: Ca Minimize workplace exposure concentrations. <u>See Appendix A</u>	
	OSHA PEL†: TWA 100 ppm C 200 ppm 300 ppm (5-minute maximum peak in any 3-hours)	
IDLH Ca [150 ppm] See: <u>127184</u>		Conversion 1 ppm = 6.78 mg/m <sup>3</sup>
<b>Physical Description</b> Colorless liquid with a mild, chloroform-like odor.		
MW: 165.8	BP: 250°F	FRZ: -2°F
VP: 14 mmHg	IP: 9.32 eV	Sol: 0.02%
FLP: NA	UEL: NA	LEL: NA
Noncombustible Liquid, but decomposes in a fire to hydrogen chloride and phosgene.		
<b>Incompatibilities &amp; Reactivities</b> Strong oxidizers; chemically-active metals such as lithium, beryllium & barium; caustic soda; sodium hydroxide; potash		
<b>Measurement Methods</b> NIOSH <u>1003</u> ; OSHA <u>1001</u> See: <u>NMAM</u> or <u>OSHA Methods</u>		
<b>Personal Protection &amp; Sanitation</b> Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation Provide: Eyewash, Quick drench		<b>First Aid (See procedures)</b> Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately
<b>Respirator Recommendations NIOSH</b> At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus		
<b>Exposure Routes</b> inhalation, skin absorption, ingestion, skin and/or eye contact		
<b>Symptoms</b> Irritation eyes, skin, nose, throat, respiratory system; nausea; flush face, neck; dizziness, incoordination; headache, drowsiness; skin erythema (skin redness); liver damage; [potential occupational carcinogen]		
<b>Target Organs</b> Eyes, skin, respiratory system, liver, kidneys, central nervous system		

**MSDS** Material Safety Data Sheet

From: Mallinckrodt Baker, Inc.  
222 Red School Lane  
Phillipsburg, NJ 08865



Mallinckrodt  
CHEMICALS



24 Hour Emergency Telephone: 800-858-2151  
CHEMTREC: 1-800-424-6300

National Response in Canada  
CANUTEC: 613-696-6666

Outside U.S. and Canada  
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

**TRICHLOROETHYLENE**

MSDS Number: T4940 — Effective Date: 09/14/00

**1. Product Identification**

**Synonyms:** Trichloroethene; TCE; acetylene trichloride; Ethinyl trichloride

**CAS No.:** 79-01-6

**Molecular Weight:** 131.39

**Chemical Formula:** C<sub>2</sub>HCl<sub>3</sub>

**Product Codes:**

J.T. Baker: 5376, 9454, 9458, 9464, 9473, 9474

Mallinckrodt: 8598, 8600, 8633

**2. Composition/Information on Ingredients**

Ingredient	CAS No	Percent	Hazardous
Trichloroethylene	79-01-6	100%	Yes

**Hazards Identification****Emergency Overview**

**WARNING! HARMFUL IF SWALLOWED OR INHALED. AFFECTS HEART, CENTRAL NERVOUS SYSTEM, LIVER AND KIDNEYS. CAUSES SEVERE SKIN IRRITATION. CAUSES IRRITATION TO EYES AND RESPIRATORY TRACT. SUSPECT CANCER HAZARD. MAY CAUSE CANCER.** Risk of cancer depends on level and duration of exposure.

J.T. Baker SAF-T-DATA<sup>(tm)</sup> Ratings (Provided here for your convenience)

Health Rating: 3 - Severe (Cancer Causing)

Flammability Rating: 1 - Slight

Reactivity Rating: 1 - Slight

Contact Rating: 2 - Moderate

Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES

Storage Color Code: Blue (Health)

---

## Potential Health Effects

---

### Inhalation:

Vapors can irritate the respiratory tract. Causes depression of the central nervous system with symptoms of visual disturbances and mental confusion, incoordination, headache, nausea, euphoria, and dizziness. Inhalation of high concentrations could cause unconsciousness, heart effects, liver effects, kidney effects, and death.

### Ingestion:

Cases irritation to gastrointestinal tract. May also cause effects similar to inhalation. May cause coughing, abdominal pain, diarrhea, dizziness, pulmonary edema, unconsciousness. Kidney failure can result in severe cases. Estimated fatal dose is 3-5 ml/kg.

### Skin Contact:

Cause irritation, redness and pain. Can cause blistering. Continued skin contact has a defatting action and can produce rough, dry, red skin resulting in secondary infection.

### Eye Contact:

Vapors may cause severe irritation with redness and pain. Splashes may cause eye damage.

### Chronic Exposure:

Chronic exposures may cause liver, kidney, central nervous system, and peripheral nervous system effects. Workers chronically exposed may exhibit central nervous system depression, intolerance to alcohol, and increased cardiac output. This material is linked to mutagenic effects in humans. This material is also a suspect carcinogen.

### Aggravation of Pre-existing Conditions:

Persons with pre-existing skin disorders, cardiovascular disorders, impaired liver or kidney or respiratory function, or central or peripheral nervous system disorders may be more susceptible to the effects of the substance.

---

## 4. First Aid Measures

### Inhalation:

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.

### Ingestion:

Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Call a physician.

### Skin Contact:

Immediately flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention. Wash clothing before reuse. Thoroughly clean shoes before reuse.

### Eye Contact:

Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

### Note to Physician:

Do not administer adrenaline or epinephrine to a victim of chlorinated solvent poisoning.

## Fire Fighting Measures

### Fire:

Autoignition temperature: 420C (788F)

Flammable limits in air % by volume:

lcl: 8; ucl: 12.5

### Explosion:

A strong ignition source, e. g., a welding torch, can produce ignition. Sealed containers may rupture when heated.

### Fire Extinguishing Media:

Use water spray to keep fire exposed containers cool. If substance does ignite, use CO2, dry chemical or foam.

### Special Information:

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

Combustion by-products include phosgene and hydrogen chloride gases. Structural firefighters' clothing provides only limited protection to the combustion products of this material.

## 6. Accidental Release Measures

Ventilate area of leak or spill. Remove all sources of ignition. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Use non-sparking tools and equipment. Collect liquid in an appropriate container or absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

## Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Isolate from any source of heat or ignition. Isolate from incompatible substances. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product.

## Exposure Controls/Personal Protection

### Airborne Exposure Limits:

Trichloroethylene:

-OSHA Permissible Exposure Limit (PEL):

100 ppm (TWA), 200 ppm (Ceiling),

300 ppm/5min/2hr (Max)

-ACGIH Threshold Limit Value (TLV):

50 ppm (TWA) 100 ppm (STEL);

listed as A5, not suspected as a human carcinogen.

**Ventilation System:**

A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

**Personal Respirators (NIOSH Approved):**

If the exposure limit is exceeded and engineering controls are not feasible, wear a supplied air, full-facepiece respirator, airlined hood, or full-facepiece self-contained breathing apparatus. Breathing air quality must meet the requirements of the OSHA respiratory protection standard (29CFR1910.134). This substance has poor warning properties. Where respirators are required, you must have a written program covering the basic requirements in the OSHA respirator standard. These include training, fit testing, medical approval, cleaning, maintenance, cartridge change schedules, etc. See 29CFR1910.134 for details.

**Skin Protection:**

Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact. Neoprene is a recommended material for personal protective equipment.

**Eye Protection:**

Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

## 9. Physical and Chemical Properties

**Appearance:**

Clear, colorless liquid.

**Odor:**

Chloroform-like odor.

**Solubility:**

Practically insoluble in water. Readily miscible in organic solvents.

**Specific Gravity:**

1.47 @ 20C/4C

**pH:**

No information found.

**% Volatiles by volume @ 21C (70F):**

100

**Boiling Point:**

87C (189F)

**Melting Point:**

-73C (-99F)

**Vapor Density (Air=1):**

4.5

**Vapor Pressure (mm Hg):**

57.8 @ 20C (68F)

**Evaporation Rate (BuAc=1):**

No information found.

## 10. Stability and Reactivity

**Stability:**

Stable under ordinary conditions of use and storage. Will slowly decompose to hydrochloric acid when exposed to light and moisture.

**Hazardous Decomposition Products:**

May produce carbon monoxide, carbon dioxide, hydrogen chloride and phosgene when heated to decomposition.

**Hazardous Polymerization:**

Will not occur.

**Incompatibilities:**

Strong caustics and alkalis, strong oxidizers, chemically active metals, such as barium, lithium, sodium, magnesium, titanium and beryllium, liquid oxygen.

**Conditions to Avoid:**

Heat, flame, ignition sources, light, moisture, incompatibles

## 1. Toxicological Information

**Toxicological Data:**

Trichloroethylene: Oral rat LD50: 5650 mg/kg; investigated as a tumorigen, mutagen, reproductive effector.

**Reproductive Toxicity:**

This material has been linked to mutagenic effects in humans.

-----\Cancer Lists\-----			
Ingredient	---NTP Carcinogen---		IARC Category
	Known	Anticipated	
Trichloroethylene (79-01-6)	No	Yes	2A

## 2. Ecological Information

**Environmental Fate:**

When released into the soil, this material may leach into groundwater. When released into the soil, this material is expected to quickly evaporate. When released to water, this material is expected to quickly evaporate. This material has an experimentally-determined bioconcentration factor (BCF) of less than 100. This material is not expected to significantly bioaccumulate. When released into the air, this material may be moderately degraded by reaction with photochemically produced hydroxyl radicals. When released into the air, this material is expected to have a half-life between 1 and 10 days.

**Environmental Toxicity:**

The LC50/96-hour values for fish are between 10 and 100 mg/l. This material is expected to be slightly toxic to aquatic life.

## 3. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved incinerator or disposed in a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

## 14. Transport Information

### Domestic (Land, D.O.T.)

-----  
 Proper Shipping Name: TRICHLOROETHYLENE  
 Hazard Class: 6.1  
 UN/NA: UN1710  
 Packing Group: III  
 Information reported for product/size: 5GL

### International (Water, I.M.O.)

-----  
 Proper Shipping Name: TRICHLOROETHYLENE  
 Hazard Class: 6.1  
 UN/NA: UN1710  
 Packing Group: III  
 Information reported for product/size: 5GL

### International (Air, I.C.A.O.)

-----  
 Proper Shipping Name: TRICHLOROETHYLENE  
 Hazard Class: 6.1  
 UN/NA: UN1710  
 Packing Group: III  
 Information reported for product/size: 5GL

## 15. Regulatory Information

-----\Chemical Inventory Status - Part 1\-----				
Ingredient	TSCA	EC	Japan	Australia
Trichloroethylene (79-01-6)	Yes	Yes	Yes	Yes

-----\Chemical Inventory Status - Part 2\-----				
Ingredient	Korea	DSL	--Canada-- NDSL	Phil.
Trichloroethylene (79-01-6)	Yes	Yes	No	Yes

-----\Federal, State & International Regulations - Part 1\-----				
Ingredient	-SARA 302- RQ	TPQ	-SARA 313- List	Chemical Catg.
Trichloroethylene (79-01-6)	No	No	Yes	No

-----\Federal, State & International Regulations - Part 2\-----			
Ingredient	CERCLA	-RCRA- 261.33	-TSCA- 8(d)
Trichloroethylene (79-01-6)	100	U228	No

Chemical Weapons Convention: No      TSCA 12(b): No      CDTA: No  
 SARA 311/312: Acute: Yes      Chronic: Yes      Fire: No      Pressure: No  
 Reactivity: No      (Pure / Liquid)

**WARNING:**

THIS PRODUCT CONTAINS A CHEMICAL(S) KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER.

**Australian Hazchem Code:** No information found.

**Poison Schedule:** S6

**WHMIS:**

This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

## 6. Other Information

**NFPA Ratings:** Health: 2 Flammability: 1 Reactivity: 0

**Label Hazard Warning:**

WARNING! HARMFUL IF SWALLOWED OR INHALED. AFFECTS HEART, CENTRAL NERVOUS SYSTEM, LIVER AND KIDNEYS. CAUSES SEVERE SKIN IRRITATION. CAUSES IRRITATION TO EYES AND RESPIRATORY TRACT. SUSPECT CANCER HAZARD. MAY CAUSE CANCER. Risk of cancer depends on level and duration of exposure.

**Label Precautions:**

Do not get in eyes, on skin, or on clothing.

Do not breathe vapor.

Keep container closed.

Use only with adequate ventilation.

Wash thoroughly after handling.

Keep away from heat and flame.

**Label First Aid:**

If swallowed, induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse. In all cases call a physician. Note to physician: Do not administer adrenaline or epinephrine to a victim of chlorinated solvent poisoning.

**Product Use:**

Laboratory Reagent.

**Revision Information:**

MSDS Section(s) changed since last revision of document include: 8, 11.

**Disclaimer:**

\*\*\*\*\*

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\*\*\*\*\*

**Prepared by:** Strategic Services Division

**Phone Number:** (314) 539-1600 (U.S.A.)

**Form 26 - Attachment B - Material Safety Data Sheets (MSDSs)**

Insert Material Safety Data Sheets (MSDSs) here.

# MATERIAL SAFETY DATA SHEET

**Schaeffer Mfg. Company**  
**102 Barton Street**  
**St. Louis, MO 63104**

**Emergency Telephone No.**  
**(314) 865-4105 or**  
**(800) 325-9962**

## SECTION 1 – PRODUCT INFORMATION

<b>Chemical Family:</b> Petroleum Hydrocarbons	<b>Trade Name:</b> #137 Diesel Treat 2000
<b>Formula:</b> Proprietary Mixture.	

## SECTION 2 – HAZARDOUS INGREDIENTS

COMPONENTS-CHEMICAL NAMES AND COMMON NAMES	CAS Number	%	Exposure Limits			
			TVL		PEL	
			ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>
Petroleum Distillate	68477-31-6	6-8		5		5
Naphthalene	91-20-3	.86	10	52	10	50
(Thiocyanomethylthio) Benzothiazole	21564-17-6	<1	NE		NE	
Heavy Aromatic Naphtha	64742-94-5	.2-1		5		5
Ethyl Hexyl Nitrate	27247-96-7	30-40	8			
Light Naphthenic Distillate	64742-53-6	25-30		5		5
Pyrene	1330-20-7	.87	100	434	150	651

## Section 3 – PHYSICAL DATA

<b>Boiling Point:</b>	300° F/148.8° C	<b>Specific Gravity:</b>	.9083
<b>Vapor Pressure (mm, Hg):</b>	<.1	<b>% Volatile:</b>	<15
<b>Vapor Density (Air = 1):</b>	Not Determined	<b>Evaporation Rate: (=1)</b>	Not Determined
<b>Solubility in Water:</b>	Disperses	<b>pH:</b>	Not Applicable
<b>Appearance and Odor:</b> Red color, slight aromatic odor.			

## SECTION 4 – FIRE AND EXPLOSION HAZARD DATA

<b>Flash Point (Method)</b> ° F/° C: 75° F/23.89° C PMCC	<b>Flammability Limits UEL &amp; LEL</b> ----Not Determined
<b>Extinguishing Media:</b> Carbon dioxide foam, dry chemical foam, sand, earth, waterfog.	
<b>Special Fire Fighting Procedures:</b> For fires involving this material, do not enter any enclosed or confined space without protective equipment including self-contained breathing apparatus. Cool exposed containers with waterspray. Avoid breathing vapors.	
<b>Unusual Fire &amp; Explosion Hazards:</b> This product is flammable.	

## SECTION 5 - REACTIVITY HAZARD DATA

<b>STABILITY</b> <input checked="" type="checkbox"/> STABLE <input type="checkbox"/> UNSTABLE	<b>Hazardous Decomposition</b> <input type="checkbox"/> WILL <input checked="" type="checkbox"/> WILL NOT OCCUR
<b>Conditions to Avoid:</b> High heat, high energy ignition sources	
<b>Compatibility (Mat. to avoid):</b> Strong oxidizing agents, amines, phenols, halogen compounds.	
<b>Hazardous Decomposition Products:</b> Oxides of carbon and nitrogen.	
<b>Conditions to Avoid:</b> None.	

## SECTION 6 - HEALTH HAZARD DATA

<b>Threshold Limit Value and Sources:</b> None established.
<b>Acute Effects of Overexposure:</b>
<b>Ingestion:</b> Harmful or fatal if swallowed.
<b>Eye Contact:</b> Liquid contact produces severe irritation to the eyes.
<b>Skin Contact:</b> Prolonged and repeated contact with the skin can cause redness or severe irritation.
<b>Inhalation:</b> Inhalation of vapors can cause headache, dizziness, nausea, or decreased blood pressure.
<b>CHRONIC EFFECTS OF OVEREXPOSURE:</b> None currently known.
<b>Emergency and First Aid Procedures:</b>
<b>Swallowing:</b> If a large amount of this material is swallowed give a large amount of water to drink. Do not induce vomiting. Seek medical attention immediately.
<b>Skin:</b> Wash skin thoroughly with soap and water. Launder contaminated clothing.
<b>Inhalation:</b> Remove victim to fresh air. If breathing has stopped start artificial respiration immediately.
<b>Eyes:</b> Flush eyes with clear, cool, clean water for 15 minutes. Seek medical attention immediately

## SECTION 7 - SPILL OR LEAK PROCEDURES

**Environmental Impact:** This material is not expected to present any environmental problems other than those associated with oil spills. If spilled into a watercourse, call the Coast Guard Toll Free No. 800-424-8802.

**Procedures To Be Taken If Material Is Released or Spilled:** Eliminate all sources of ignition. Absorb spills with absorbent clay. Ventilate confined spaces. Keep out of sewers and watercourses.

**Waste Disposal Method:** Dispose of at an approved waste or disposal site facility in accordance with all applicable federal, state and local laws and regulations.

## SECTION 8 - SPECIAL PROTECTION INFORMATION

**Respiratory Protection:** None required under ordinary conditions of use.

**Ventilation:** No special requirement under ordinary conditions of use and with adequate ventilation.

**Eye Protection:** Goggles or face shield.

**Protective Clothing:** Use air-supplied mask if used in confined space.

## SECTION 9 - SPECIAL PRECAUTIONS

**Precautions To Be Taken In Handling and Storage:** Do not store near heat, spark, flame or strong oxidizers. Keep containers closed when not in use.

**Special Comments:** Avoid breathing vapors. Avoid prolonged or repeated skin contact. Remove contaminated shoes and clothing. Throw away shoes. Launder clothing before reuse. Wash thoroughly with soap and water after use.

## SECTION 10 - ADDITIONAL HEALTH AND TOXICOLOGICAL DATA

**HMIS & NFPA Ratings:** Health = 2 Fire = 3 Reactivity = 0

Contaminated clothing should be disposed of properly and/or decontaminated before reuse. Under no circumstance should vomiting be induced. Vomiting can cause aspiration of the product into the lungs. If aspirated into the lungs, chemical pneumonia, which may cause death in spite of treatment with oxygen and antibiotics, may result.

Probable mucosal damage may contraindicate the use of gastric lavage. Measures against circulatory shock, respiratory depression and convulsion may be needed.

This product does not contain any levels of the chemicals that are listed as potential cancer causing agents as determined by the National Toxicology Program's Annual Reports, OSHA's Subpart Z list, the International Agency for Cancer Research's Monograph's or the State of California's Proposition 65 list.

For SARA Title III Information, see below.

### SARA TITLE III INFORMATION

Section 302/304 Extremely Hazardous  
Component

CAS#	%	RQ (lbs.)	RQ (gal.)*
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None

Section 102(a) CERCLA Hazardous  
Substance

CAS#	%	RQ (lbs.)	RQ (gals.)
Ethylbenzene 100-41-4	.02-.2	1000	66,138-661,376
Naphthalene 91-20-3	.86	100	1528
Xylene 1330-20-7	.87	1000	15,204

Component

Ethylbenzene

Naphthalene

Xylene

\*Product RQ for Stationary Sources Release Regulatory.

Title Section 311 Hazardous Categorization

Acute	Chronic	Fire	Pressure	Reactivity
X	X	X		

Section 313 Toxic Chemical

Component

Ethylbenzene

Naphthalene

Xylene

CAS#	%
Ethylbenzene 100-41-4	.02-.2
Naphthalene 91-20-3	.86
Xylene 1330-20-7	.87

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**Alconox® Material Safety Data Sheet**

Alconox, Inc.  
30 Glenn Street, Suite 309  
White Plains, NY 10603

24 Hour Emergency Number - Chem-Tel (800) 255-3924

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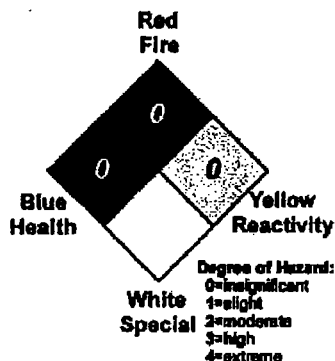
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**I. Identification**

Product Name (shown on label):	ALCONOX
CAS Registry Number:	Not Applicable
Effective Date:	January 1, 2001
Chemical Family:	Anionic Powdered Detergent
Mfr. Catalog #s for Sizes:	1104, 1125, 1150, 1101, 1103, 1112

**II. Hazardous Ingredients/Identity Information**

There are no hazardous ingredients in ALCONOX as defined by the OSHA Standard and Hazardous Substance List 29 CFR 1910 Subpart Z.

**National Fire Protection Association 704 Labeling:**

NJTSRN: 1100

**III. Physical/Chemical Characteristics**

Boiling Point (F):	Not Applicable
Vapor Pressure (mm Hg):	Not Applicable
Vapor Density (AIR=1):	Not Applicable
Specific Gravity (Water=1):	Not Applicable
Evaporation Rate (Butyl Acetate=1):	Not Applicable
Melting Point:	Not Applicable
Solubility in Water:	Appreciable-Soluble to 10% at ambient conditions
Appearance:	White powder interspersed with cream colored flakes.
pH:	9.5 (1%)

**IV. Fire and Explosion Data**

Flash Point (Method Used):	None
Flammable Limits:	LEL: No Data UEL: No Data
Extinguishing Media:	Water, dry chemical, CO2, foam
Special Fire fighting Procedures:	Self-contained positive pressure breathing apparatus and protective clothing should be worn when fighting fires involving chemicals.
Unusual Fire and Explosion Hazards:	None

**V. Reactivity Data**

Stability:	Stable
Hazardous Polymerization:	Will not occur
Incompatibility (Materials to Avoid):	None
Hazardous Decomposition or Byproducts:	May release CO2 on burning

**VI. Health Hazard Data**

Route(s) of Entry:	Inhalation? Yes Skin? No Ingestion? Yes
Health Hazards (Acute and Chronic):	Inhalation of powder may prove locally irritating to mucous membranes. Ingestion may cause discomfort and/or diarrhea. Eye contact may prove irritating.
Carcinogenicity:	NTP? No IARC Monographs? No OSHA Regulated? No
Signs and Symptoms of Exposure:	Exposure may irritate mucous membranes. May cause sneezing.
Medical Conditions Generally Aggravated by Exposure:	Not established. Unnecessary exposure to this product or any industrial chemical should be avoided. Respiratory conditions may be aggravated by powder.
Emergency and First Aid Procedures:	Eyes: Immediately flush eyes with water for at least 15 minutes. Call a physician. Skin: Flush with plenty of water. Ingestion: Drink large quantities of water or milk. Do not induce vomiting. If vomiting occurs administer fluids. See a physician for discomfort.

**VII. Precautions for Safe Handling and Use**

Steps to be Taken if Material is Released or Spilled:	Material foams profusely. Recover as much as possible and flush remainder to sewer. Material is biodegradable.
Waste Disposal Method:	Small quantities may be disposed of in sewer. Large quantities should be disposed of in accordance with local ordinances for detergent products.
Precautions to be Taken in Storing and Handling:	Material should be stored in a dry area to prevent caking.
Other Precautions:	No special requirements other than the good industrial hygiene and safety practices employed with any industrial chemical.

**VII. Control Measures**

Respiratory Protection (Specify Type):	Dust mask - Recommended
Ventilation:	Local Exhaust-Normal Special-Not Required

	Mechanical-Not Required Other-Not Required
Protective Gloves:	Impervious gloves are useful but not required.
Eye Protection:	Goggles are recommended when handling solutions.
Other Protective Clothing or Equipment:	None
Work/Hygienic Practices:	No special practices required

THE INFORMATION HEREIN IS GIVEN IN GOOD FAITH BUT NO WARRANTY IS EXPRESSED OR IMPLIED.

30 GLENN STREET, SUITE 309 WHITE PLAINS, NY 10603 USA PH: (914) 948-4040 FAX: (914) 948-4041

CDN

# Material Safety Data Sheet

## Hydrochloric Acid 0.01 to 3.0N

ACC# 40067

### Section 1 - Chemical Product and Company Identification

**MSDS Name:** Hydrochloric Acid 0.01 to 3.0N**Catalog Numbers:** S70041-2, S71944, S74855, S74856, S80036, S80039, A48520, A4854, EMHX0607-1, FLSA4820LC, GILHYDCHLOR, LC153305, MCC--030293, MCC--030294, NC9619313, NC9655533, NC9668809, NC9748699, NC9751086, NC9751601, S70041-3, S718255, S74856MF, S80037, SA431-500, SA48-1, SA48-20, SA48-4, SA48-500, SA4820LC, SA50-1, SA50-20, SA50-20LC, SA50-4, SA52-20, SA52-500, SA54-1, SA54-10, SA54-20, SA54-4, SA55, SA60-1, SA62-1, SA814, SA81410, SA81420, SA8144, XX41704L, XX4200LI, XXSLN4426200LI, XXSLNALL0200LI  
**Synonyms:** Chlorohydric acid; Hydrogen chloride; Muriatic acid; Spirits of salt; Hydrochloride.**Company Identification:**Fisher Scientific  
1 Reagent Lane  
Fair Lawn, NJ 07410**For information, call:** 201-796-7100**Emergency Number:** 201-796-7100**For CHEMTREC assistance, call:** 800-424-9300**For International CHEMTREC assistance, call:** 703-527-3887

### Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
7732-18-5	Water	>89.1	231-791-2
7647-01-0	Hydrochloric acid	.04-10.9	231-595-7

**Hazard Symbols:** XN C**Risk Phrases:** 35 20

### Section 3 - Hazards Identification

#### EMERGENCY OVERVIEW

**Appearance:** colorless to slight yellow clear liquid. **Danger!** Corrosive. Causes eye and skin burns. May cause severe respiratory tract irritation with possible burns. May cause severe digestive tract irritation with possible burns.

**Target Organs:** Respiratory system, eyes, skin, circulatory system, mucous membranes.

**Potential Health Effects**

**Eye:** May cause irreversible eye injury. Vapor or mist may cause irritation and severe burns. Contact with liquid is corrosive to the eyes and causes severe burns. May cause painful sensitization to light.

**Skin:** Contact with liquid is corrosive and causes severe burns and ulceration.

**Ingestion:** May cause circulatory system failure. Causes severe digestive tract burns with

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3/28/2003

abdominal pain, vomiting, and possible death. May cause corrosion and permanent tissue destruction of the esophagus and digestive tract.

**Inhalation:** May cause severe irritation of the respiratory tract with sore throat, coughing, shortness of breath and delayed lung edema. Causes chemical burns to the respiratory tract. Exposure to the mist and vapor may erode exposed teeth. Causes corrosive action on the mucous membranes.

**Chronic:** Prolonged or repeated skin contact may cause dermatitis. Repeated exposure may cause erosion of teeth. May cause fetal effects. Laboratory experiments have resulted in mutagenic effects. Prolonged exposure may cause conjunctivitis, photosensitization, and possible blindness.

## Section 4 - First Aid Measures

**Eyes:** Get medical aid immediately. Do NOT allow victim to rub or keep eyes closed. Extensive irrigation with water is required (at least 30 minutes). **SPEEDY ACTION IS CRITICAL!**

**Skin:** In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical aid immediately. Wash clothing before reuse.

**Ingestion:** If swallowed, do NOT induce vomiting. Get medical aid immediately. If victim is fully conscious, give a cupful of water. Never give anything by mouth to an unconscious person.

**Inhalation:** If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.

**Notes to Physician:** Do NOT use sodium bicarbonate in an attempt to neutralize the acid.

**Antidote:** Do NOT use oils or ointments in eye.

## Section 5 - Fire Fighting Measures

**General Information:** As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Water runoff can cause environmental damage. Dike and collect water used to fight fire. Not flammable, but reacts with most metals to form flammable hydrogen gas. Use water spray to keep fire-exposed containers cool. Vapors may be heavier than air. They can spread along the ground and collect in low or confined areas. Reaction with water may generate much heat which will increase the concentration of fumes in the air. Containers may explode when heated. Approach fire from upwind to avoid hazardous vapors and toxic decomposition products.

**Extinguishing Media:** For large fires, use water spray, fog, or alcohol-resistant foam. Substance is nonflammable; use agent most appropriate to extinguish surrounding fire. Do NOT use straight streams of water. Most foams will react with the material and release corrosive/toxic gases. Cool containers with flooding quantities of water until well after fire is out. For small fires, use carbon dioxide (except for cyanides), dry chemical, dry sand, and alcohol-resistant foam.

**Flash Point:** Not applicable.

**Autoignition Temperature:** Not applicable.

**Explosion Limits, Lower:** Not available.

**Upper:** Not available.

**NFPA Rating:** (estimated) Health: 3; Flammability: 0; Instability: 0

## Section 6 - Accidental Release Measures

**General Information:** Use proper personal protective equipment as indicated in Section 8.

**Spills/Leaks:** Large spills may be neutralized with dilute alkaline solutions of soda ash, or lime. Avoid runoff into storm sewers and ditches which lead to waterways. Clean up spills immediately, observing precautions in the Protective Equipment section. Remove all sources of ignition. Provide ventilation. Do not get water inside containers. A vapor suppressing foam may be used to reduce vapors. Cover with dry earth, dry sand, or other non-combustible material followed with plastic sheet to minimize spreading and contact with water.

## Section 7 - Handling and Storage

**Handling:** Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Use only in a well-ventilated area. Contents may develop pressure upon prolonged storage. Do not breathe dust, vapor, mist, or gas. Do not get in eyes, on skin, or on clothing. Keep container tightly closed. Do not ingest or inhale. Discard contaminated shoes. Use caution when opening. Keep from contact with moist air and steam.

**Storage:** Do not store in direct sunlight. Keep container closed when not in use. Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances. Corrosives area. Do not store in metal containers. Do not store near flammable or oxidizing substances (especially nitric acid or chlorates). Store away from alkalis.

## Section 8 - Exposure Controls, Personal Protection

**Engineering Controls:** Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.

### Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Water	none listed	none listed	none listed
Hydrochloric acid	C 5 ppm	50 ppm IDLH	C 5 ppm; C 7 mg/m3

**OSHA Vacated PELs:** Water: No OSHA Vacated PELs are listed for this chemical. Hydrochloric acid: C 5 ppm; C 7 mg/m3

### Personal Protective Equipment

**Eyes:** Wear chemical goggles.

**Skin:** Wear neoprene or polyvinyl chloride gloves to prevent exposure.

**Clothing:** Wear appropriate protective clothing to prevent skin exposure.

**Respirators:** A respiratory protection program that meets OSHA's 29 CFR §1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant a respirator's use.

## Section 9 - Physical and Chemical Properties

**Physical State:** Clear liquid

**Appearance:** colorless to slight yellow

**Odor:** strong, pungent

**pH:** 0.10 (1.0N soln)

**Vapor Pressure:** 160 mm Hg @ 20 deg C

**Vapor Density:** 1.26 (air=1)

**Evaporation Rate:**>1(N-butyl acetate = 1)  
**Viscosity:** Not available.  
**Boiling Point:** 81.5-110 deg C @ 760 mmHg  
**Freezing/Melting Point:**-17 deg C  
**Decomposition Temperature:**Not available.  
**Solubility:** Soluble.  
**Specific Gravity/Density:**1.16 (water=1)  
**Molecular Formula:**HCl  
**Molecular Weight:**36.46

## Section 10 - Stability and Reactivity

**Chemical Stability:** Stable under normal temperatures and pressures.

**Conditions to Avoid:** Metals, excess heat.

**Incompatibilities with Other Materials:** Bases, acetic anhydride, alkali metals, aluminum, amines, copper, copper alloys, fluorine, iron, sodium hydroxide, steel, sulfuric acid, vinyl acetate, zinc, potassium permanganate, cesium acetylene carbide, rubidium acetylene carbide, rubidium carbide, sodium, chlorosulfonic acid, oleum, carbonates, perchloric acid, calcium phosphide, metal oxides, acetates, cesium carbide, beta-propiolactone, ethyleneimine, propylene oxide, lithium silicides, alcohols + hydrogen cyanide, 2-aminoethanol, ammonium hydroxide, calcium carbide, 1,1-difluoroethylene, ethylene diamine, magnesium boride, mercuric sulfate, silver perchlorate + carbon tetrachloride, uranium phosphide.

**Hazardous Decomposition Products:** Hydrogen chloride, chlorine, carbon monoxide, carbon dioxide, hydrogen gas.

**Hazardous Polymerization:** Will not occur.

## Section 11 - Toxicological Information

**RTECS#:**

**CAS# 7732-18-5:** ZC0110000

**CAS# 7647-01-0:** MW4025000

**LD50/LC50:**

**CAS# 7732-18-5:**

Oral, rat: LD50 = >90 mL/kg;

**CAS# 7647-01-0:**

Inhalation, mouse: LC50 = 1108 ppm/1H;

Inhalation, rat: LC50 = 3124 ppm/1H;

Oral, rabbit: LD50 = 900 mg/kg;

**Carcinogenicity:**

**CAS# 7732-18-5:** Not listed by ACGIH, IARC, NIOSH, NTP, or OSHA. **CAS# 7647-01-0:**

**IARC:** Group 3 carcinogen

**Epidemiology:** Experimental reproductive effects have been reported.

**Teratogenicity:** Embryo or Fetus: Stunted fetus, Inhalation, rat TCL0=450 mg/m<sup>3</sup>/1H Specific Developmental Abnormalities: homeostatis, ihl-rat TCL0=450 mg/m<sup>3</sup>/1H (female 1 days pre-mating).

**Reproductive Effects:** No information available.

**Neurotoxicity:** No information available.

**Mutagenicity:** Cytogenetic analysis: Hamster, lung = 30 mmol/L.; Cytogenetic analysis: Hamster, ovary = 8 mmol/L.

**Other Studies:** No data available.

## Section 12 - Ecological Information

**Ecotoxicity:** Fish: Bluegill/Sunfish: 3.6 mg/L; 48 Hr; Lethal (unspecified) Bluegill/Sunfish: LD50; 96 Hr; pH 3.0-3.5 No data available.

**Environmental:** Rapidly hydrolyzes when exposed to water. Will exhibit extensive evaporation from soil surfaces. Upon transport through the soil, hydrochloric acid will dissolve some of the soil materials (especially those with carbonate bases) and the acid will neutralize to some degree.

**Physical:** Log P(oct) = .25 (calculated)

**Other:** No information available.

## Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

**RCRA P-Series:** None listed.

**RCRA U-Series:** None listed.

## Section 14 - Transport Information

	US DOT	IATA	RID/ADR	IMO	Canada TDG
<b>Shipping Name:</b>	HYDROCHLORIC ACID				HYDROCHLORIC ACID SOLUTION
<b>Hazard Class:</b>	8				8(9.2)
<b>UN Number:</b>	UN1789				UN1789
<b>Packing Group:</b>	II				II

## Section 15 - Regulatory Information

### US FEDERAL

#### TSCA

CAS# 7732-18-5 is listed on the TSCA inventory.

CAS# 7647-01-0 is listed on the TSCA inventory.

#### Health & Safety Reporting List

None of the chemicals are on the Health & Safety Reporting List.

#### Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

#### Section 12b

None of the chemicals are listed under TSCA Section 12b.

#### TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

#### SARA

### Section 302 (RQ)

CAS# 7647-01-0: final RQ = 5000 pounds (2270 kg)

**Section 302 (TPQ)**

CAS# 7647-01-0: TPQ = 500 pounds; RQ = 5000 pounds (does not meet toxicity criteria but because of high production volume and recognized toxicity is considered a chemical of concern)

**SARA Codes**

CAS # 7647-01-0: acute.

**Section 313**

This chemical is not at a high enough concentration to be reportable under Section 313. No chemicals are reportable under Section 313.

**Clean Air Act:**

CAS# 7647-01-0 is listed as a hazardous air pollutant (HAP). This material does not contain any Class 1 Ozone depleters. This material does not contain any Class 2 Ozone depleters.

**Clean Water Act:**

CAS# 7647-01-0 is listed as a Hazardous Substance under the CWA. None of the chemicals in this product are listed as Priority Pollutants under the CWA. None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

**OSHA:**

CAS# 7647-01-0 is considered highly hazardous by OSHA.

**STATE**

CAS# 7732-18-5 is not present on state lists from CA, PA, MN, MA, FL, or NJ.

CAS# 7647-01-0 can be found on the following state right to know lists: California, New Jersey, Florida, Pennsylvania, Minnesota, Massachusetts.

California No Significant Risk Level: None of the chemicals in this product are listed.

**European/International Regulations**

**European Labeling in Accordance with EC Directives**

**Hazard Symbols:**

XN C

**Risk Phrases:**

R 35 Causes severe burns.

R 20 Harmful by inhalation.

**Safety Phrases:**

S 26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

**WGK (Water Danger/Protection)**

CAS# 7732-18-5: No information available.

CAS# 7647-01-0: 1

**Canada - DSL/NDSL**

CAS# 7732-18-5 is listed on Canada's DSL List.

CAS# 7647-01-0 is listed on Canada's DSL List.

**Canada - WHMIS**

This product has a WHMIS classification of E.

**Canadian Ingredient Disclosure List**

CAS# 7647-01-0 is listed on the Canadian Ingredient Disclosure List.

**Exposure Limits**

CAS# 7647-01-0: OEL-AUSTRALIA:TWA 5 ppm (7 mg/m<sup>3</sup>) OEL-AUSTRIA:TWA 5 ppm (7 mg/m<sup>3</sup>) OEL-BELGIUM:STEL 5 ppm (7.7 mg/m<sup>3</sup>) OEL-DENMARK:STEL 5 ppm (7 mg/m<sup>3</sup>) OEL-FINLAND:STEL 5 ppm (7 mg/m<sup>3</sup>);Skin OEL-FRANCE:STEL 5 ppm (7.5 mg/m<sup>3</sup>) OEL-GERMANY:TWA 5 ppm (7 mg/m<sup>3</sup>) OEL-HUNGARY:STEL 5 mg/m<sup>3</sup> OEL-JAPAN:STEL 5 ppm (7.5 mg/m<sup>3</sup>) OEL-THE NETHERLANDS:TWA 5 p

pm (7 mg/m<sup>3</sup>) OEL-THE PHILIPPINES:TWA 5 ppm (7 mg/m<sup>3</sup>) OEL-POLAND:TWA 5 mg/m<sup>3</sup> OEL-RUSSIA:STEL 5 ppm (5 mg/m<sup>3</sup>) OEL-SWEDEN:STEL 5 ppm (8 mg/m<sup>3</sup>) OEL-SWITZERLAND:TWA 5 ppm (7.5 mg/m<sup>3</sup>);STEL 10 ppm (15 mg/m<sup>3</sup>) OEL-THAILAND:TWA 5 ppm (7 mg/m<sup>3</sup>) OEL-TURKEY:TWA 5 ppm (7 mg/m<sup>3</sup>) OEL-UNITED KINGDOM:TWA 5 ppm (7 mg/m<sup>3</sup>);STEL 5 ppm (7 mg/m<sup>3</sup>) OEL IN BULGARIA, COLOMBIA, JORDAN, KOREA check ACGIH TLV OEL IN NEW ZEALAND, SINGAPORE, VIETNAM check ACGIH TLV

## Section 16 - Additional Information

**MSDS Creation Date:** 4/14/1999

**Revision #4 Date:** 2/06/2002

*The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.*

# Material Safety Data Sheet

## Nitric Acid Solution

ACC# 40072

### Section 1 - Chemical Product and Company Identification

**MSDS Name:** Nitric Acid Solution**Catalog Numbers:** SA94-1, SA95**Synonyms:** Dilute Nitric Acid**Company Identification:**

Fisher Scientific

1 Reagent Lane

Fair Lawn, NJ 07410

**For information, call:** 201-796-7100**Emergency Number:** 201-796-7100**For CHEMTREC assistance, call:** 800-424-9300**For International CHEMTREC assistance, call:** 703-527-3887

### Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
7732-18-5	Water	96	231-791-2
7697-37-2	Nitric acid	4	231-714-2

**Hazard Symbols:** C**Risk Phrases:** 34

### Section 3 - Hazards Identification

#### EMERGENCY OVERVIEW

**Appearance:** colourless liquid. **Danger!** Corrosive. Causes eye and skin burns. May cause severe respiratory tract irritation with possible burns. May cause severe digestive tract irritation with possible burns.

**Target Organs:** No data found.

**Potential Health Effects**

**Eye:** Causes eye burns.

**Skin:** Causes skin burns.

**Ingestion:** May cause severe and permanent damage to the digestive tract. Causes gastrointestinal tract burns.

**Inhalation:** Causes chemical burns to the respiratory tract.

**Chronic:** Prolonged or repeated skin contact may cause dermatitis.

### Section 4 - First Aid Measures

<https://fscimage.fishersci.com/msds/40072.htm>

3/28/2003

**Eyes:** Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid immediately. Do NOT allow victim to rub or keep eyes closed.

**Skin:** Get medical aid immediately. Immediately flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Destroy contaminated shoes.

**Ingestion:** Do NOT induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid immediately.

**Inhalation:** Get medical aid immediately. Remove from exposure to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen.

**Notes to Physician:** Treat symptomatically and supportively.

## Section 5 - Fire Fighting Measures

**General Information:** As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Use water spray to keep fire-exposed containers cool. Substance is noncombustible.

**Extinguishing Media:** Substance is noncombustible; use agent most appropriate to extinguish surrounding fire.

**Flash Point:** Not available.

**Autoignition Temperature:** Not available.

**Explosion Limits, Lower:** Not available.

**Upper:** Not available.

**NFPA Rating:** (estimated) Health: 4; Flammability: 0; Instability: 1; Special Hazard: OX

## Section 6 - Accidental Release Measures

**General Information:** Use proper personal protective equipment as indicated in Section 8.

**Spills/Leaks:** Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Clean up spills immediately, observing precautions in the Protective Equipment section. Neutralize spill with sodium bicarbonate.

## Section 7 - Handling and Storage

**Handling:** Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Keep container tightly closed. Do not get on skin or in eyes. Do not ingest or inhale. Use with adequate ventilation. Discard contaminated shoes.

**Storage:** Keep container closed when not in use. Store in a cool, dry, well-ventilated area away from incompatible substances.

## Section 8 - Exposure Controls, Personal Protection

**Engineering Controls:** Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.

### Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
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Water	none listed	none listed	none listed
Nitric acid	2 ppm TWA; 4 ppm STEL	2 ppm TWA; 5 mg/m3 TWA 25 ppm IDLH	2 ppm TWA; 5 mg/m3 TWA

**OSHA Vacated PELs:** Water: No OSHA Vacated PELs are listed for this chemical. Nitric acid: 2 ppm TWA; 5 mg/m3 TWA; 4 ppm STEL; 10 mg/m3 STEL

**Personal Protective Equipment**

**Eyes:** Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

**Skin:** Wear appropriate protective gloves to prevent skin exposure.

**Clothing:** Wear appropriate protective clothing to prevent skin exposure.

**Respirators:** Follow the OSHA respirator regulations found in 29CFR 1910.134 or European Standard EN 149. Always use a NIOSH or European Standard EN 149 approved respirator when necessary.

## Section 9 - Physical and Chemical Properties

**Physical State:** Liquid

**Appearance:** colourless

**Odor:** odorless

**pH:** 1.0 (0.1M solution)

**Vapor Pressure:** Not available.

**Vapor Density:** Not available.

**Evaporation Rate:**Not available.

**Viscosity:** Not available.

**Boiling Point:** 100 deg C

**Freezing/Melting Point:**0 deg C

**Decomposition Temperature:**Not available.

**Solubility:** Soluble in water.

**Specific Gravity/Density:**1.004

**Molecular Formula:**HNO3 mixture

**Molecular Weight:**Not available.

## Section 10 - Stability and Reactivity

**Chemical Stability:** Decomposes when in contact with air, light, or organic matter.

**Conditions to Avoid:** High temperatures, incompatible materials, moisture, reducing agents.

**Incompatibilities with Other Materials:** Acids (organic, e.g. acetic acid, benzoic acid, formic acid, methanoic acid, oxalic acid), alcohols and glycols (e.g. butyl alcohol, ethanol, methanol, ethylene glycol), aldehydes (e.g. acetaldehyde, acrolein, chloral hydrate, formaldehyde), amides (e.g. butyramide, diethyltoluamide, dimethyl formamide), amines (aliphatic and aromatic, e.g. dimethyl amine, propylamine, pyridine, triethylamine), azo, diazo, and hydrazines (e.g. dimethyl hydrazine, hydrazine, methyl hydrazine), carbamates (e.g. carbanolate, carbofuran), caustics (e.g. ammonia, ammonium hydroxide, calcium hydroxide, potassium hydroxide, sodium hydroxide), cyanides (e.g. potassium cyanide, sodium cyanide), dithiocarbamates (e.g. ferbam, maneb, metham, thiram), esters (e.g. butyl acetate, ethyl acetate, propyl formate), ethers (e.g. dioxane, furfuran, tetrahydrofuran (THF)), fluorides (inorganic, e.g. ammonium fluoride, calcium fluoride, cesium fluoride), hydrocarbons (aromatic, e.g. benzene, chrysene, cumene, toluene), halogenated organics (e.g. dibromoethane, hexachlorobenzene, methyl chloride, trichloroethylene), isocyanates (e.g. methyl isocyanate), ketones (e.g. acetone, acetophenone, MEK, MIBK), mercaptans and other

organic sulfides (e.g. butyl mercaptan, carbon disulfide, methanethiol), metals (alkali and alkaline, e.g. cesium, potassium, sodium), metals as powders (e.g. hafnium, raney nickel), metals as non-powders (e.g. brass, bronze, iron), metals and metal compounds (toxic, e.g. beryllium, lead acetate, nickel carbonyl, tetraethyl lead), nitrides (e.g. potassium nitride, sodium nitride), nitriles (e.g. acetonitrile, methyl cyanide), nitro compounds (organic, e.g. nitrobenzene, nitroglycerine, picric acid, trinitrotoluene), hydrocarbons (aliphatic, unsaturated, e.g. cyclopentene, ethylene, heptene), hydrocarbons (aliphatic, saturated, e.g. butane, heptane, isooctane), peroxides and hydroperoxides (organic, e.g. acetyl peroxide, benzoyl peroxide, butyl peroxide, methyl ethyl ketone peroxide), ph.

**Hazardous Decomposition Products:** Nitrogen oxides.

**Hazardous Polymerization:** Will not occur.

## Section 11 - Toxicological Information

**RTECS#:**

**CAS# 7732-18-5:** ZC0110000

**CAS# 7697-37-2:** QU5775000; QU5900000

**LD50/LC50:**

**CAS# 7732-18-5:**

Oral, rat: LD50 = >90 mL/kg;

**CAS# 7697-37-2:**

Inhalation, rat: LC50 = 67 ppm(NO2)/4H;

**Carcinogenicity:**

**CAS# 7732-18-5:** Not listed by ACGIH, IARC, NIOSH, NTP, or OSHA. **CAS# 7697-37-2:** Not listed by ACGIH, IARC, NIOSH, NTP, or OSHA.

**Epidemiology:** No data available.

**Teratogenicity:** No data available.

**Reproductive Effects:** No data available.

**Neurotoxicity:** No data available.

**Mutagenicity:** No data available.

**Other Studies:** No data available.

## Section 12 - Ecological Information

No Information available.

## Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

**RCRA P-Series:** None listed.

**RCRA U-Series:** None listed.

## Section 14 - Transport Information

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**Form 27 – Attachment C – Safety Procedures/Field Operating  
Procedures (FLD Ops)**

Insert the appropriate Safety Procedures/Field Operating Procedures here.

## **FLD 01      OCCUPATIONAL NOISE AND HEARING CONSERVATION**

(Final revision 11/8/1999)

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### **GENERAL**

Noise is defined as unwanted sound. Noise can cause sudden traumatic temporary or permanent hearing loss, long term slowly occurring sensory-neural and irreversible hearing loss, disruption of communication, and masking of warning devices and alarms. Increased stress levels and effects on the cardiovascular and nervous systems have been documented as additional concerns.

The goal of this operating practice is to reduce and potentially eliminate hazardous levels of noise exposure.

### **REFERENCES**

29 CFR 1910.95

### **RESPONSIBILITIES**

**Project Manager or Supervisor:** The Project Manager or employee's supervisor shall ensure that WESTON and subcontract personnel under their control comply with the requirements of this procedure and have the necessary resources to assure compliance. The Project Manager or Supervisor will ensure that hazard assessment, monitoring and control procedures have been implemented.

**Safety Officer:** The safety officer (site, project or region) shall assist the Project Manager or Supervisor in understanding the technical requirements of this practice.

**The Corporate Health and Safety (CHS) Director:** The CHS Director or his designees (e.g., safety professionals, safety officers, division safety managers, or operations health and safety group) will provide assistance with interpretations of this practice. The CHS Director will ensure periodic evaluation of this operating practice through practice review and inspections.

**Occupational Medical Provider (OMP):** WESTON's OMP will assist in compliance with this practice through evaluation of clinics, verification of baseline exams and annual employee audiogram evaluation. The OMP will advise the Safety Officer and, if necessary, the CHS Director of any problems associated with medical compliance or occupationally related hearing loss in workers.

**Employees:** All affected employees are responsible for complying with the requirements of this practice. Any concerns or questions regarding compliance is to be brought the attention of the Safety Officer, the Project Manager, or the Supervisor.

Revised 11/1999

## **Recognition and Risk Assessment**

Employee noise exposure is expressed as an eight-hour time-weighted average (full shift exposure) in decibels (dB) on the "A-scale" (dBA). This number is to be compared to the Occupational Safety and Health Administration's Permissible Exposure Limit (PEL) which is an 8-hour time-weighted average (TWA) of 90 dBA, and the OSHA Action Level (AL) which is 85 dBA. Table G-16 in 29 CFR 1910.95 provides information regarding time-equivalent PELs.

The PEL is a limit which should not be exceeded, and the AL is a noise level threshold which when exceeded obligates the employer to establish a Hearing Conservation Program (HCP). The HCP includes baseline and annual hearing tests, and hearing conservation training. Whenever there is a reasonable possibility of employee noise exposure over 85 decibels, the affected employee is enrolled in the HCP.

The need for noise monitoring equipment, noise dosimeters or hearing protection devices must be addressed in the planning stages of a project. WESTON personnel and WESTON subcontractors are to wear hearing protection devices when required and where signs are posted requiring their use.

Some of the sources of noise at hazardous materials sites, demolition operations, construction and industrial sites which can cause hearing damage are: compressor motors, drill rig engines, hammer blows (such as from a split spoon), compressor motors, compressed air, and heavy equipment. Examples of approximate noise levels from various activities are as follows:

- Rock Drilling: up to 115 dBA
- Chain Saws: up to 125 dBA
- Abrasive Blasting: up to 110 dBA
- Heavy Equipment: 95 to 110 dBA
- Demolition: up to 117 dBA
- Needle Guns: up to 112 dBA
- Riveter/Chipper: up to 120 dBA
- Noisy Factory: up to 90 dBA
- Noisy Office: 70 to 80 dBA
- Conversational Speech: 60 dBA

## **Noise Evaluation and Surveillance Procedures**

Noise exposure assessment is performed only by qualified personnel with properly calibrated and functional noise measuring equipment. If the HASP or the Safety Officer indicate that the site, or activity, requires an instrumentation survey then the area will be screened with an A-weighted sound level meter (Area Monitoring). If deemed necessary a more in depth evaluation utilizing a noise dosimeter may be performed (Personnel Monitoring). Both types of monitoring, if needed, will be accomplished in accordance with requirements established in 29 CFR 1910.95(d).

Revised 11/1999

Long-term work efforts at fixed locations (e.g., water treatment plants, incinerators, etc.) will require an evaluation of noise levels utilizing instrumentation. Re-monitoring may be necessary when changes in equipment, processes or activities result in modification of the noise level.

If impact noise is present, the peak noise levels and the frequency of the impacts should be determined. Both OSHA and the American Conference of Governmental Industrial Hygienists (ACGIH) recommend certain limits to impact noise which depend on the noise intensity and frequency of the impacts. These resources and/or qualified personnel should be consulted if questions arise regarding impact or impulse noise.

## **Noise Control Methods**

### **Engineering Controls**

The primary means of reducing or eliminating personnel exposure to hazardous noise is through engineering controls. Engineering controls are defined as any modification or replacement of equipment, or related physical change at the noise source or along the sound transmission path that will reduce the noise level to the employee's ear. Engineering controls include items such as; mufflers on heavy equipment or motors, sound baffles, and enclosures.

### **Administrative Controls**

Administrative controls are defined as changes in the work schedule or operations which reduce noise exposure. These controls include increasing worker distance from the noise source and rotation of jobs so that time limits of exposure are reduced.

Administrative time control is not a preferable method for preventing noise exposure since extreme noise for a short duration can cause severe, permanent hearing loss. Administrative controls may be utilized in accordance with the TWA Tables (see 29 CFR 1910.95, Table G-16). Administrative controls may not be utilized for exposures greater than 115 dBA, regardless of the exposure time.

### **Hearing Protection**

Hearing protection devices are utilized whenever engineering controls prove to be infeasible or cost prohibitive. Various types of ear muffs and ear plugs are available. Hearing protector attenuation is intended to reduce employee exposures below 85 dBA for employees with standard threshold shifts and below 90 dBA for all other employees.

Hearing protection devices are strongly recommended in any noisy environment, but are mandatory in the following situations:

- The eight hour average may equal or exceed 90 decibels.
- Any employee exposed to greater than or equal to 85 decibels and who have experienced a standard threshold shift (STS) in their hearing.
- Any noise equal to greater than 115 decibels impact, continuous or intermittent.
- Anywhere a "HEARING PROTECTION REQUIRED" sign is posted. These signs are to be posted in all mandatory situations listed above.

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In the absence of sound level measuring instrumentation, any noise preventing normal vocal discussion between two individuals at arms length distance ("arms-length rule") will dictate the need for hearing protection. WESTON guidelines require the use of hearing protection on an immediate basis under the "arms-length rule". Exceptions may be granted based upon task and duration.

Not all hearing protection devices have the same noise reduction rating (NRR). Verification of all NNR values must be made by referring to the manufacturers' specifications.

The proper hearing protection is selected using results from a properly calibrated sound level meter in the following manner. The NRR of the device chosen is reduced by subtracting. Then this resulting number is subtracted from the noise level in dBA (for example: if the noise reading is 100 dBA, and the ear plugs selected have a NRR of 27. Subtracting 7 from 27 equals 20. Subtracting 20 from 100 equals 80. The attenuated sound level to the wearer is 80). Appendix B of 29 CFR 1910.95 provides information on attenuation adequacy using other monitoring devices or scales.

Hearing protection must attenuate employee exposure to an 8-hour TWA of 90 dBA or less. WESTON will strive to accomplish an attenuation of 85 dBA or less. For any employee diagnosed with a standard threshold shift, the attenuation must be 85 dBA or less.

Additional information regarding the selection, use, maintenance, and control of hearing protection devices is provided in the WESTON Personnel Protective Equipment Program.

### **Medical Surveillance**

Compliance with the Hearing Conservation Program (HCP) component of 29 CFR 1910.95 is required whenever an employee's exposure to noise in excess of 85 dBA occurs. As such, field employees whose job descriptions require work with drill rigs, heavy construction equipment or noisy client operations would be candidates for the HCP and medical surveillance requirements thereof. Supervisors of any employees not meeting the categories above (e.g., treatment plant operations, print shop, maintenance personnel) are required to determine the need for those employees to participate in the HCP by performing noise surveys, and advise their safety officer who will in turn notify the Occupational Medical Provider.

WESTON's Occupational Medical Provider will make the final determination of employee involvement in the medical surveillance component of the HCP.

Audiometric testing is performed annually to evaluate the hearing of all individuals who are routinely exposed to 8 hour TWA exposures of 85 dBA or greater (including compliance with the "arms-length rule"). By evaluating the hearing of these individuals, the overall effectiveness of the Occupational Noise and Hearing Conservation Program can be systematically monitored. WESTON's Occupational Medical Provider is responsible for assuring local clinic compliance with the audiometric testing component of the standard.

Revised 11/1999

## **Training**

Initial and annual training shall be given to each employee included in the Hearing Conservation Program. Training will address the following:

The effects of noise on hearing.

- The purpose of hearing protection, advantages, disadvantages, attenuation of various types, and the selection, fitting, use, and care of protectors.
- The purpose of audiometric tests and explanation of test procedures.
- Recognition of hazardous noise.

WESTON's initial and refresher courses under 29 CFR 1910.120 (Hazardous Waste Operations and Emergency Response) are utilized to deliver these training obligations. Alternative training will be given to employees who are included in the HCP but who are not trained in accordance with Hazardous Waste Operations and Emergency Response requirements.

## **Program Evaluation**

Periodic program evaluations will be conducted to assess compliance with 29 CFR 1910.95 and this operating practice. The CHS Director (or his designee) is responsible for reviewing this practice on an annual basis. WESTON's Occupational Medical Provider is responsible for assisting in this evaluation by providing information relative to employee exposure and medical surveillance data.

## **Recordkeeping**

Employee exposure measurements are retained for a minimum of two years and audiometric test records are retained for the duration of the employee's employment, plus thirty years.

Revised 11/1999

**GENERAL**

**REFERENCES**

Related FLD OPS:

*FLD05 – Heat Stress Prevention and Monitoring*

*FLD06 – Cold Stress*

*FLD25 – Working at Elevations*

*FLD26 – Ladders*

*FLD27 – Scaffolds*

**PROCEDURE**

Hot weather (ambient temperatures over 70°F), cold weather (ambient temperatures below 40°F), rain, snow, ice, and lightning are examples of inclement weather that may be hazardous or add risk to work activities. Heat stress and cold stress are covered under separate operating procedures.

Extremes of heat, cold, and humidity, as well as rain, snow, and ice, can adversely affect monitoring instrument response and reliability, respiratory protection performance, and chemical protective clothing materials.

**Heat**

Additional examples and protection from heat stress are addressed in WESTON Safety Procedure FLD05. Hot, dry weather increases risk of soil drying, erosion, and dust dispersion, which may present or increase risk of exposure and environmental impact from toxic hazards. Hot weather will increase pressure on closed containers and the rate of volatilization, thereby potentially increasing the risk of exposure to toxic, flammable, or explosive atmospheres.

**Rain, Wet Weather, and High Humidity**

Rain and wet conditions increase slipping and tripping hazards, braking distances of vehicles, and the potential for slippage or handling difficulties for devices such as augers and drills. Rain fills holes, obscures trip and fall hazards, and increases risk of electrical shock when working with electrical equipment. Changes in soil conditions caused by rain can impact trenching and excavating activities, creating the potential for quicksand formation, wall collapse, and cave-in. Vehicles become stuck in mud, and tools and personnel can slip on wet surfaces.

Rain and wet conditions may decrease visibility (especially for personnel wearing respiratory protection) and limit the effectiveness of certain direct-reading instruments (e.g., photoionization detectors [PIDs]).

Revised 11/1999

## **Cold, Snow, and Ice**

In addition to cold stress, which is covered in WESTON field procedure FLD06, cold weather affects vehicle operation by increasing difficulty in starting and braking. Ice, frost, and snow can accumulate on windows and reduce vision.

Cold, wet weather can cause icing of roadways, driveways, parking areas, general work places, ladders, stairs, and platforms. Ice is not always as obvious to see as snow or rain, and requires special attention, especially when driving or walking.

Snow and ice increase the risk of accidents such as slipping when walking, climbing steps and ladders, or working at elevation, and the risk of accidents when driving vehicles or operating heavy equipment. Heavy snow and ice storms may cause electric lines to sag or break, and the use of electrical equipment in snow increases the risk of electric shock. Snow can hide potholes and mud, which can result in vehicles getting stuck or persons falling when stepping into hidden holes. Snow also may cover water, drums or other containers, sharp metal objects, debris, or other objects that can cause falls or punctures.

Personnel performing activities that require working over ice should be aware of minimal ice thickness safety guidelines as follows:

- 4-inch minimum: activities such as walking or skating.
- 6-inch minimum: activities such as snowmobiling or the use of equipment with the same weight and cross-sectional area as a snowmobile.

Personnel should always be aware that these measurements are under ideal conditions and that snow cover, conditions on rivers, ponds, or lakes with active currents, and other environmental factor impact the safety of working on ice. Clear ice typically is the strongest, while ice that appears cloudy or honeycombed is not as structurally strong. Measurements made by drilling or cutting through the ice should be made every few feet to verify safe conditions. Under no circumstances should WESTON personnel operate motor vehicles such as cars or trucks on ice.

Provisions for rescue (e.g., ladders or long poles and effective communications) must be available at the work site.

## **Lightning**

Lightning represents a hazard of electrical shock that is increased when working in flat open spaces, elevated work places, or near tall structures or equipment such as stacks, radio towers, and drill rigs. Lightning has caused chemical storage tank fires and grass or forest fires. Static charges associated with nearby electrical storms can increase risk of fire or explosion when working around flammable materials, and can adversely affect monitoring instruments.

Revised 11/1999

## **Recognition and Risk Assessment**

Few Occupational Safety and Health Administration (OSHA) regulations apply to the conditions covered in this procedure; however, under specific standards (e.g., Construction Industry, Subpart P, Excavations) and the OSHA General Duty Clause, inclement weather hazards must be addressed in safety programs.

Heat, rain, cold, snow, ice, and lightning are natural phenomena that complicate work activities, and add or increase risk. The potential for physical hazards must be considered for tasks that expose personnel to inclement weather. Risk assessment can be accomplished during the planning stages of a project by developing a task risk analysis for the most likely inclement weather conditions that may be encountered, i.e., rain and lightning in late spring, summer, and early fall, or lightning prone areas; cold, snow, and ice in winter. The SHSC must make decisions on the proper safety procedure and recommend them to the site manager. Each worker must evaluate the risk associated with his or her work and be actively alert to these hazards. Any site worker may stop work if safety procedures are not followed or the risk is too great.

A pre-site activity risk assessment must be completed when inclement weather occurs. Weather conditions that affect instruments and PPE function must be conveyed to site workers. All personnel should monitor function and integrity of PPE and be alert to changing weather conditions. A decision must be made on the proper safety procedures to use if work must continue, or to stop work if the risk is too great. The Appropriate Safety Professional **must be notified of all instances of the need to stop work for safety reasons, including inclement weather.**

## **Prevention and Protection Programs**

Procedures applicable to inclement weather include the following:

Monitoring equipment and PPE must be maintained in proper working order and used according to manufacturers' instructions.

Walkways, stairs, ladders, elevated workplaces, and scaffold platforms must be kept free of mud, ice, and snow.

Vehicles used in rain or cold weather must have windshield wipers and defrosters, and windows must be kept clear of obstruction.

Employees must be protected from airborne contaminants using engineering controls such as wetting dry soil to prevent particle dispersion, and providing local ventilation to reduce volatile air contaminants to safe levels, or if engineering controls are infeasible, using prescribed personal protective equipment (PPE).

Required conformance with traffic laws, including maintaining speed within limits safe for weather conditions, and wearing seat belts at all times.

Using a walking stick or probe to test footing ahead of persons walking where there is standing water, snow, or ice to protect the walker against stepping into potholes or onto puncture hazards, buried containers, or other potential structurally unsound surfaces.

Revised 11/1999

Prior to using vehicles or equipment in off-road work, walking the work area or intended travelway when puddles or snow may obscure potholes, puncture hazards, or buried containers, or other potential structurally unsound surfaces.

Arranging to have winches, come-alongs, or other mechanical assistance available when vehicles are used in areas where there is increased risk of getting stuck. Cable or rope and mechanical equipment used for pulling stuck vehicles must be designed for the purpose, of sufficient capacity for the load, and be inspected regularly and before use to ensure safety. **Manually pushing stuck vehicles is to be avoided.**

Monitoring wind shifts and velocity where change may result in dispersion of airborne contaminants into work area.

Prior to working in areas or beginning projects during times when there is an increased likelihood of lightning or the potential for lightning striking personnel, steps must be taken to predict the occurrence of lightning strikes, including:

- a) Checking with client management to determine if there is any pattern or noted conditions that predict lightning or if there are structures that are prone to lightning strikes. Arrange for client notification when there is increased potential for lightning activities. Ensure that clients include WESTON workers in lightning contingency plans.
- b) Monitoring weather reports.
- c) Noting weather changes and conditions that produce lightning.
- d) Stopping work in open areas, around drill rigs or other structures that may attract lightning, on or in water and in elevated work places when lightning strikes are sighted or thunder is heard near a work site.
- e) Ensuring all personnel are provided with safe areas of refuge. Keep personnel from standing in open areas, under lone trees, or under drill rigs.

Revised 11/1999

## **FLD 05      HEAT STRESS PREVENTION AND MONITORING**

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### **GENERAL**

Heat stress may occur at any time work is performed at elevated temperatures. Wearing chemical protective clothing often decreases natural body heat loss and increases the risk of heat stress.

If the body's physiological processes fail to maintain a normal body temperature because of excessive heat, a number of physical reactions can occur, with symptoms ranging from mild (such as fatigue, irritability, anxiety, and decreased concentration or dexterity) to fatal. Because heat stress is one of the most common and potentially serious illnesses at hazardous waste sites, regular monitoring and other preventive measures are vital to ensure worker safety.

Employees who are taking prescription or over-the-counter medications should consult with their personal physician prior to working in high-temperature environments.

### **REFERENCES**

OSHA 29 CFR 1910 and 1926

Related FLD OPS:

*FLD02 – Inclement Weather*

*FLD03 – Hot Processes – Steam*

*FLD08 – Confined Space Entry*

*FLD36 – Welding, Cutting and Burning*

*FLD37 – Pressure Washing*

### **APPENDICES**

A Common Heat Stress Disorders and Their Prevention and Treatment

### **PROCEDURE**

#### **Recognition and Risk Assessment**

In the planning stages of a project, the potential for heat stress disorders must be considered as a physical hazard in the site-specific Health and Safety Plan (HASP). Risk assessment can be accomplished in the development stages of a project by listing in the HASP the most likely heat stress disorders that may occur.

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The SHSC must make decisions on the proper safety procedures and recommend them to the site manager. Each worker must evaluate the risk associated with his or her work and be actively alert to these hazards. Any site worker may stop work if safety procedures are not followed or the risk is too great. In addition, all site personnel must be aware of these symptoms in both themselves and their co-workers.

Four common heat stress disorders and their associated prevention and treatment methods are provided in Appendix A.

### **Prevention and Protection Programs**

Heat stress is affected by several interacting factors including, but not limited to, age, obesity, physical condition, substance abuse, level of personal protective equipment worn, and environmental conditions (temperature, shade, and humidity). Site workers must learn to recognize and treat the various forms of heat stress. The best approach is preventive heat stress management such as the examples given below.

Have workers drink 16 ounces of water before beginning work, at established breaks, and in the morning or after lunch. The body's normal thirst mechanism is not sensitive enough to ensure body fluid replacement, therefore, pre- and post-work fluid intake is necessary. Under heavy work and heat conditions, the body may lose up to 2 gallons of fluids per day. In order to prevent heat stress symptoms, the individual must ensure replacement of this moisture.

Provide disposable cups that hold about 4 ounces, and water that is maintained at 50 to 60°F. Have workers drink 16 ounces of water before beginning work, and a cup or two at each break period. Provide a shaded area for rest breaks. Discourage the intake of caffeinated drinks during working hours. Monitor for signs of heat stress.

Encourage workers to maintain a good diet during these periods. In most cases, a balanced diet and lightly salted foods should help maintain the body's electrolyte balance. Bananas are especially good for maintaining the body's potassium level. The most important measure to prevent heat-related illness is adequate fluid intake. Workers should drink 1/2 to 1 quarts of liquids per hour in high heat conditions. Most of this liquid should be water.

If utilizing commercial electrolyte mixes, double the amount of water called for in the package directions. Indications are that "full-strength" preparations taken under high heat stress conditions may actually decrease the body's electrolytes.

Acclimate workers to site work conditions by slowly increasing workloads, i.e., do not begin work activities with extremely demanding tasks. Rotate shifts of workers who are required to wear impervious clothing in hot weather. In extremely hot weather, conduct field activities in the early morning and evening.

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Provide cooling devices to aid natural body heat regulation. These devices, however, add weight and their use should be balanced against worker efficiency. An example of a cooling aid is long cotton underwear, which acts as a wick to absorb moisture and protect the skin from direct contact with heat-absorbing protective clothing.

Ensure that adequate shelter is available to protect personnel against heat and direct sunlight, which can decrease physical efficiency and increase the probability of heat stress. If possible, set up the command post in the shade.

Good hygienic standards must be maintained by frequent showering and changes of clothing. Clothing should be permitted to dry during rest periods. Persons who notice skin problems should immediately consult medical personnel.

### **Heat Stress Monitoring and Work Cycle Management**

When strenuous field activities are part of on-going site work conducted in hot weather, the following guidelines should be used to monitor the body's physiological response to heat, and to manage the work cycle, even if workers are not wearing impervious clothing. These procedures should be instituted when the temperature exceeds 70°F and the tasks/risk analysis indicates an increased risk of heat stress problems. Consult the HASP and a safety professional (e.g., Division safety manager, safety officer) if questions arise as to the need for specific heat stress monitoring. In all cases, the site personnel must be aware of the signs and symptoms of heat stress and provide adequate rest breaks and proper aid as necessary.

Measure Heart Rate – Heart rate should be measured by the radial pulse for 30 seconds as early as possible in the rest period. The heart rate at the beginning of the rest period should not exceed 110 beats per minute. If the heart rate is higher, the next work period should be shortened by 33%, while the length of the rest period stays the same. If the pulse rate still exceeds 110 beats per minute at the beginning of the next rest period, the following work cycle should be further shortened by 33%. The procedure is continued until the rate is maintained below 110 beats per minute.

Measure Body Temperature – When ambient temperatures are over 90°F, body temperatures should be measured with a clinical thermometer as early as possible in the rest period. If the oral temperature exceeds 99.6°F (or 1 degree change from baseline) at the beginning of the rest period, the following work cycle should be shortened by 33%. The procedure is continued until the body temperature is maintained below 99.6°F (or 1 degree change from baseline). Under no circumstances should a worker be allowed to work if their oral temperature exceeds 100.6°F.

Measure Body Water Loss – Body water loss greater than 1.5% of total body weight is indicative of a heat stress condition. Body weight is measured before personal protective equipment (PPE) is donned and after the PPE is removed following a work cycle. Body water loss can be measured with an ordinary bathroom scale, however, the scale must be sensitive to one-half pounds increments. A worker is required to drink additional fluids and rest if their body water loss is greater than 1.5%.

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Note: For purposes of this operating practice, a break is defined as a 15-minute period and/or until an individual's vital signs are within prescribed guidelines.

A physiological monitoring schedule is determined by following the steps below:

Measure the air temperature with a standard thermometer.

Estimate the fraction of sunshine by judging what percent the sun is out (refer to Table 1).

Calculate the adjusted temperature based on the following formula:

Adjusted Temperature = Actual Temperature + 13 X  
(fraction of the percent sunshine factor)

Using Table 2, determine the physiological monitoring schedule for fit and acclimated workers.

The length of work period is governed by frequency of physiological monitoring (Table 2). The length of the rest period is governed by physiological parameters (heart rate and oral temperature). For example, site personnel anticipate wearing level C (impermeable clothing) during site activities.

The air temperature is 80°F and there are no clouds in the sky (100% sunshine). The adjusted temperature is calculated in the following manner:

Adjusted Temperature (Adj T °F) = Actual Temperature (Amb T °F) + (13 x fraction of the percent sunshine factor).

Adj T °F = 80°F + (13 x 1.0)

Adj T °F = 93°F

Using Table 2, the pulse rate, oral temperature and body water loss monitoring would be conducted after each 60 minutes of work. The adjusted temperature may need to be redetermined if the percent sunshine and ambient temperature changes drastically during site work.

If an individual's heart rate exceeds 110 beats per minute at the beginning of the rest period, that individual will continue to rest until his or her heart rate drops to baseline; the next work period is then decreased by 33%.

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TABLE 1

**PERCENT SUNSHINE FACTORS  
HEAT STRESS PREVENTION AND MONITORING**

Percent Sunshine (%)	Cloud Cover	Sunshine fraction
100	No cloud cover	1.0
50	50% cloud cover	0.5
0	Full cloud cover	0.0

**TABLE 2**

**PHYSIOLOGICAL MONITORING SCHEDULE  
HEAT STRESS PREVENTION AND MONITORING**

Adjusted Temperature	Level D (Permeable clothing)	Level C, B, or A (Nonpermeable clothing)
90°F (32.2°C) or above	After each 45 minutes of work	After each 15 minutes of work
87.5°F (30.8°C-32.2°C)	After each 60 minutes of work	After each 30 minutes of work
82.5°F-87.5°F (28.1°C-32.2°C)	After each 90 minutes of work	After each 60 minutes of work
77.5°F-82.5°F (25.3°C-28.1°C)	After each 120 minutes of work	After each 90 minutes of work
72.5°F-77.5°F (22.5°C-25.3°C)	After each 150 minutes of work	After each 120 minutes of work

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## **APPENDIX A**

### **COMMON HEAT STRESS DISORDERS AND THEIR PREVENTION AND TREATMENT**

#### **Heat Rash**

Heat rash is caused by continuous exposure to heat and humidity, and is aggravated by chafing clothes. The condition decreases an individual's ability to tolerate heat and can be extremely uncomfortable.

Symptoms – Mild red rash, especially in areas of the body that come into contact with protective gear.

Treatment – Decrease amount of time spent working in protective gear and provide body powder to help absorb moisture and decrease chafing.

#### **Heat Cramps**

Heat cramps are caused by inadequate electrolyte intake. The individual may be receiving adequate water, however, if not combined with an adequate supply of electrolytes, the blood can thin to the point where it seeps into the active muscle tissue, causing cramping.

Symptoms – Acute painful spasms of voluntary muscles, most notably the abdomen and extremities.

Treatment – Move the victim to a cool area and loosen clothing. Have the victim drink 1 to 2 cups of lightly salted water or diluted commercial electrolyte solution immediately, and then every 20 minutes thereafter until symptoms subside. Electrolyte supplements can enhance recovery (e.g., Gatorade, Quench) however, it is best to double the amount of water required by the dry mix package directions or add water to the liquid form.

#### **Heat Exhaustion**

Heat exhaustion is a state of very definite weakness or exhaustion caused by the loss of fluids from the body. The condition is much less dangerous than heat stroke, but it nonetheless must be treated.

Symptoms – Pale, clammy, and moist skin, profuse perspiration, and extreme weakness. Body temperature is normal, pulse is weak and rapid, and breathing is shallow. The person may have a headache, may vomit, and may feel dizzy.

Treatment – Move the victim to a cool, air-conditioned or temperature-controlled area, loosen clothing, place in a position with the head lower than the feet (shock prevention), and allow the victim to rest. Consult a physician, especially in severe cases. Have the victim drink 1 to 2 cups of water immediately, and every 20 minutes thereafter until symptoms subside.

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## **Heat Stroke**

Heat stroke is an acute and dangerous reaction to heat stress caused by a failure of the body's heat regulating mechanisms, i.e., the individual's temperature control system (sweating) stops working correctly. Body temperature rises so high that brain damage and death may result if the person is not cooled quickly.

Symptoms – Red, hot, dry skin (although the person may have been sweating earlier); nausea, dizziness, confusion, extremely high body temperature, rapid respiratory and pulse rate, unconsciousness or coma.

Treatment – Remove the victim from the source of heat and cool the victim quickly. If the body temperature is not brought down quickly, permanent brain damage or death may result. Soak the victim in cool (not cold) water, sponge the body with cool water, or pour water on the body to reduce the temperature to a safe level (less than 102°F). Monitor the victim's vital signs and obtain immediate medical help. Do not give the victim coffee, tea, or alcoholic beverages.

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**REFERENCES**

Related FLD OPS:

*FLD02 – Inclement Weather*

*FLD07 – Wet Feet*

*FLD15 – Remote Areas*

*FLD17 – Diving*

*FLD18 – Using Boats*

*FLD19 – Working Over Water*

*FLD25 – Working at Elevations*

**PROCEDURE**

Persons working outdoors in low temperatures (below 40°F), and especially at or below freezing, are subject to cold stress. Exposure to extreme cold for a short time can cause severe injury to the surface of the body, or result in profound generalized cooling which, unchecked, could ultimately cause death. Areas of the body that have high surface-area-to-volume ratios, such as fingers, toes, and ears, are the most susceptible.

Chemical protective clothing generally does not afford protection against cold stress. In many instances, it increases susceptibility. Chemical hazard site workers must learn to dress carefully to provide both chemical protection and thermal insulation while not dressing so warmly that exercise or strenuous activity will result in cold stress.

Body heat is conserved through the constriction of surface blood vessels. This constriction reduces circulation at the skin layers and keeps blood nearer the body core.

Loss of body heat can occur through:

1. Respiration – In extreme cold, cover the mouth and nose with wool or fur to “pre-warm” the air you breath.
2. Evaporation – Wear layered clothing, and remove outer layers prior to overheating to avoid soaking clothing with perspiration. Replace layers prior to becoming chilled. Wear clothing that will “breathe” or allow water vapor to escape to reduce the cooling effect of evaporation.
3. Conduction – Sitting on snow, touching cold equipment, and working in the rain are examples of how heat can be lost by conduction. A great deal of body heat is lost rapidly when a person becomes wet. Hypothermia from immersion in water has resulted in death at temperatures of 40°F or lower. Perspiration or rain should never be allowed to saturate clothing; such soaking will seriously reduce the insulative properties of the clothing, in addition to increasing heat loss. Most clothing loses approximately 90 percent of its insulating properties when wet.

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4. Radiation – The greatest amount of body heat is lost from uncovered surfaces of the body, especially the head, neck, and hands. Covering these areas is, therefore, extremely important.
5. Convection – The body continually heats a thin layer of air next to the skin. As long as this warm air is retained next to the body, it will remain warm. If this warm air is removed by air currents (wind), the body will be cooled attempting to rewarm the surface air. The primary function of clothing is to retain this warm surface layer of air while allowing water vapor to pass through. Ensure that clothing remains secure around the body, especially at the neck and waist. Wind chill or equivalent chill temperature indices describe the chilling effect of moving air in combination with low temperature.

Two major factors that influence the potential of cold injury are ambient temperature and wind velocity. The term wind chill is used to describe the chilling effect of moving air in combination with low temperature. Additionally, water conducts heat 240 times faster than air; thus, the body cools suddenly when protective equipment is removed if the clothing underneath is perspiration-soaked.

Tables 1 and 2 should be consulted to adjust working schedules for wind chill conditions. These tables are meant as guides only; ambient temperatures and wind conditions should be monitored frequently and work schedules adjusted as required. Workers' physical symptoms or condition will also be an indicator of the need to modify work schedule.

### **Recognition and Risk Assessment**

In the planning stages of a project and safety plan, the potential for cold stress disorders must be considered as physical hazards in the site-specific Health and Safety Plan (HASP). Risk assessment can be accomplished in the development stages of a project by listing in the HASP the most likely cold stress disorders which may occur. The SHSC must make decisions on the proper safety procedures and recommend them to the site manager. Each worker must evaluate the risk associated with his or her work and be actively alert to these hazards. Any site worker may stop work if safety procedures are not followed or the risk is too great. Two common cold stress disorders and treatment methods are identified below.

#### **Frostbite**

Local injury resulting from cold is included in the generic term frostbite. By definition, frostbite is the freezing of tissue, however, several stages are recognized, based on the degree of injury.

Frostbite most commonly affects the toes, fingers, and face, and occurs when an extremity loses heat faster than it can be replaced by the circulating blood. Frostbite may also result from direct exposure to extreme cold or high wind, as happens with the nose, ears, and hands. Feet may freeze because of the conduction of heat away from the skin's surface caused by damp socks and shoes.

Frostbite of the extremities can occur in three forms:

- Frost nip or incipient frostbite is characterized by sudden blanching or whitening of skin.
- Superficial frostbite is characterized by skin with a waxy or white appearance that is firm to the touch, but the tissue beneath is resilient.
- Deep frostbite is characterized by tissues that are cold, pale or darkened, and solid.

Treatment for frostbite:

- Move the victim indoors and/or away from additional exposure to cold, wet, and wind.
- Superficially frostbitten areas are best warmed by placing them next to warm skin. The basic tenant to rewarming frostbitten areas is to not raise the temperature much above that of the body. The abdomen and the armpit are body areas that can be used to rewarm frostbitten areas. Water at 99° to 104°F can be used. Avoid the use of fires, hot water, or external heaters to warm frostbitten areas.
- Give a warm drink (water or juices, **not** coffee, tea or alcohol). Do not allow the victim to smoke.
- If using water to rewarm the affected areas, keep the frozen parts in warm water until all paleness has turned to pink or burgundy red, but no longer. Remember, the tissue will be very painful as it thaws.
- After rewarming, elevate the area and protect it from further injury.
- Do not break blisters.
- Use sterile, soft, dry material to cover the injured areas.
- Keep victim warm and obtain medical care as necessary.
- Do **not** rub the frostbitten part (this may cause gangrene).
- Do **not** use ice, snow, gasoline or anything cold on the frostbitten area.
- Do **not** use heat lamps or hot water bottles to rewarm the frostbitten area.
- Do **not** place the frostbitten area near a hot stove.

## Hypothermia

Systemic hypothermia occurs when body heat loss exceeds body heat gain and the body core temperature falls below the normal 99°F. While many hypothermia cases are caused by extremely cold temperatures, most cases develop in air temperatures between 30° and 50°F, especially when compounded with water immersion or soaking, and windy conditions.

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Remember that the victim of hypothermia may not know, or refuse to admit, that he or she is experiencing hypothermia. All personnel must be observant for these signs for themselves and for other team members. Hypothermia can include one or more of the following symptoms.

- Uncontrollable shivering.
- Vague, slow, slurred speech.
- Irrational actions.
- Memory lapses.
- Incoherence.
- Fumbling hands, frequent stumbling, lurching gait.
- Apathy, listlessness, and sleepiness' inability to get up after resting.
- Unconsciousness, glassy stare, slow pulse and slow respiration.
- Death.

Below the critical body core temperature of 95°F, the body cannot produce enough heat by itself to recover. At this point, emergency measures must be taken to reverse the drop in core temperature. The victim may slip into hypothermia in a matter of minutes and can die in less than 2 hours after the first signs of hypothermia are detected. Treatment and medical assistance are critical.

Treatment for hypothermia:

- Prevent further heat loss by moving the person to a warmer location out of the wind, wet, and cold.
- Remove cold, wet clothing. If necessary, based upon the victim's condition, external sources of heat (e.g., warm blankets, warm water baths, or body contact) may be necessary to rewarm the victim.
- If the victim is conscious, provide warm liquids, candy, or sweetened foods. Carbohydrates are the food most quickly transformed into heat and energy. Do not give alcohol or caffeine.
- Keep the victim awake, monitor ABCs, perform first aid as appropriate, and obtain medical assistance soon as possible.

### **Prevention and Protection Programs**

Site workers must learn to recognize and treat the various forms of cold stress. The best approach is preventive cold stress management, such as the following:

- Wear loose, layered clothing, masks, woolen scarves, and hats in extreme cold weather.
- Keep clothes dry by wearing water and wind resistant clothing and footwear.
- Eat well-balanced meals, ensure adequate intake of liquids and avoid alcoholic beverages. Dehydration increases risk of cold stress.
- Have warm shelter available and implement work-rest schedules.
- Monitor yourself and others for changes in physical and mental condition.

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- If wearing a face protector, remove it periodically to check for frostbite.
- Never touch cold metal with bare hands.

The following guidelines should be used when working in air temperatures below 40°F.

- When cold surfaces below  $-7^{\circ}\text{C}$  ( $19.4^{\circ}\text{F}$ ) are within reach, a warning should be given to each worker by the SHSC to prevent inadvertent contact by bare skin.
- If the air temperature is  $-17.5^{\circ}\text{C}$  ( $0^{\circ}\text{F}$ ) or less, the hands should be protected by mittens. Machine controls and tools for use in cold conditions should be designed so that they can be handled without removing the mittens.

Provisions for additional total body protection are required if work is performed in an environment at or below  $4^{\circ}\text{C}$  ( $39.2^{\circ}\text{F}$ ). Workers should wear cold-protective clothing appropriate for the level of cold and physical activity:

- If the air velocity at the job site is increased by wind, draft, or artificial ventilation, the cooling effect of the wind should be reduced by shielding the work area or by wearing an easily removable windbreak garment.
- If only light work is involved and if the worker's clothing may become wet on the job site, the outer layer of the clothing in use may be of a type impermeable to water. With more severe work under such conditions, the outer layer should be water repellent, and the outerwear should be changed as it becomes wetted. The outer garments should include provisions for easy ventilation to prevent wetting of inner layers by sweat. If work is done at normal temperatures or in a hot environment before entering the cold area, the employee should make sure that clothing is not wet as a consequence of sweating. If clothing is wet, the employee should change into dry clothes before entering the cold. Workers should change socks and any removable felt insoles at regular daily intervals, or use vapor barrier boots. The optimal frequency of change should be determined empirically and will vary individually and according to the type of shoe worn and how much the individual's feet sweat.
- If the available clothing does not give adequate protection to prevent hypothermia or frostbite, work should be modified or suspended until adequate clothing is made available or until weather conditions improve.
- Workers handling evaporative liquid (gasoline, alcohol, or cleaning fluids) at air temperatures below  $4^{\circ}\text{C}$  ( $39.2^{\circ}\text{F}$ ) should take special precautions to avoid soaking clothing or gloves with the liquid because of the added danger of cold injury due to evaporative cooling.

### **Work/Warming Regimen**

If work is performed continuously in the cold at an equivalent chill temperature (ECT) or below  $-7^{\circ}\text{C}$  ( $19.4^{\circ}\text{F}$ ), heated warming shelters, tents, cabins, and break rooms should be made available nearby. Workers should be encouraged to use these shelters at regular intervals, frequency depending on the severity of the environmental exposure. The onset of heavy shivering, frostnip, the feeling of excessive fatigue, drowsiness, irritability, or euphoria are indications for immediate return to the shelter. When

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entering the heated shelter, the outer layer of clothing should be removed and the remainder of the clothing loosened to permit sweat evaporation, or the worker should change into dry clothing to avoid returning to work in wet clothing. Dehydration, or the loss of body fluids, occurs insidiously in a cold environment and may increase the susceptibility of workers to cold injury due to a significant change in blood flow to the extremities. Warm sweet drinks and soups should be provided at the work site to provide caloric intake and fluid replacement. The intake of caffeinated drinks should be limited because of the diuretic and circulatory effects.

For work practices at or below  $-12^{\circ}\text{C}$  ( $10.4^{\circ}\text{F}$ ) ECT, the following should apply:

- The worker should be under constant protective observation (buddy system or supervision).
- The work rate should not be so high as to cause heavy sweating that will result in wet clothing. If heavy work must be done, rest periods must be taken in heated shelters and opportunities to change into dry clothing should be provided.
- New employees should not be required to work full-time in the cold during the first days of employment until they become accustomed to the working conditions and the use of required protective clothing.
- The weight and bulkiness of clothing should be included in estimating the required work performance and weights to be lifted by the worker.
- The work should be arranged in such a way that sitting or standing still for long periods is minimized. The worker should be protected from drafts to the greatest extent possible.
- The workers should be instructed in safety and health procedures. The training program should include, as a minimum, instruction in:
  - Proper rewarming procedures and appropriate first aid treatment.
  - Proper use of clothing.
  - Proper eating and drinking habits.
  - Recognition of signs and symptoms of impending hypothermia or excessive cooling of the body, even when shivering does not occur.
  - Safe work practices.

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**Table 1**

**Cooling Power of Wind on Exposed Flesh Expressed as Equivalent Temperature\***

Estimated Speed (mph)	Wind	Actual Temperature Reading (°F)											
		50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
		Equivalent Chill Temperature (°F)											
Calm		50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
5		48	37	27	16	6	-5	-15	-26	-36	-47	-57	-68
10		40	28	16	4	-9	-24	-33	-46	-58	-70	-83	-95
15		36	22	9	-5	-18	-32	-45	-58	-72	-85	-99	-112
20		32	18	4	-10	-25	-39	-53	-67	-82	-96	-110	-121
25		30	16	0	-15	-29	-44	-59	-74	-88	-104	-118	-133
30		28	13	-2	-18	-33	-48	-63	-79	-94	-109	-125	-140
35		27	11	-4	-20	-35	-51	-67	-82	-98	-113	-129	-145
40		26	10	-6	-21	-37	-53	-69	-85	-100	-116	-132	-148
(Wind speeds greater than 40 mph have little additional effect.)		<b>LITTLE DANGER</b> In <1 hour with dry skin. Maximum danger of false sense of security.				<b>INCREASING DANGER</b> Danger from freezing of exposed flesh within 1 minute.			<b>GREAT DANGER</b> Flesh may freeze within 30 seconds.				
Trenchfoot and immersion foot may occur at any point on this chart.													

\* Developed by U.S. Army Research Institute of Environmental Medicine, Natick, MA.

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**Table 2**

**Cold Work/Warmup Schedule for 4-Hour Shifts,**

<b>EQUIVALENT CHILL TEMPERATURE</b>	<b>MAXIMUM WORK PERIOD</b>	<b>NO. OF BREAKS</b>
$\geq -24^{\circ}\text{F}$	Normal	1
$-25^{\circ}$ to $-30^{\circ}\text{F}$	75 minutes	2
$-31^{\circ}$ to $-35^{\circ}\text{F}$	55 minutes	3
$-36^{\circ}$ to $-40^{\circ}\text{F}$	40 minutes	4
$-41^{\circ}$ to $-45^{\circ}\text{F}$	30 minutes	5
$\leq -46^{\circ}\text{F}$	Stop work	Stop work

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**REFERENCES**

Related FLD OPS:

*FLD05 – Heat Stress Prevention and Monitoring*

*FLD06 – Cold Stress*

**PROCEDURE**

Under both hot and cold stress conditions, feet that become wet and are allowed to remain wet can lead to serious problems. Trench foot, paddy foot, and immersion foot are terms associated with foot ailments resulting from feet being wet for long periods of time. All have similar symptoms and effects. Initial symptoms include edema (swelling), tingling, itching, and severe pain. These may be followed by more severe symptoms including blistering, death of skin tissue, and ulceration.

**Recognition and Risk Assessment**

In the planning stages of a project and safety plan, the potential for wet feet must be considered as a physical hazard. Risk assessment can be accomplished in part in the development stages of a project by listing in the Health and Safety Plan (HASP), the most likely task where wet feet may occur. These tasks could include extended work in chemical protective clothing and wading during biological assessments. The SHSC must make decisions on the proper safety procedures and recommend them to the site manager. Each worker must evaluate the risk associated with his or her work and be actively alert to these hazards. Any site worker may stop work if safety procedures are not followed or the risk is too great.

**Prevention and Protection Program**

Prevention methods are required when work is performed in wet conditions or when conditions result in sweating, causing the feet to become and remain wet. Proper hygiene is critical. Workers must dry their feet and change socks regularly to avoid conditions associated with wet feet. Use of foot talc or powder can additionally assist in prevention of this type of condition.

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## PROCEDURE

Improper lifting can result in cuts, pinches, crushing, and serious injury to back, abdomen, arm and leg muscles, and joints. Even relatively light objects, lifted improperly, can contribute to injury.

### Cuts, Pinching, and Crushing

Splinters, slivers, and sharp edges on objects to be lifted can result in cuts. Heavy objects can pinch or crush fingers, toes, arms, and legs between the object and nearby objects (e.g., walls, tables, counters, or railings).

### Muscle and Joint Injuries

Muscle and joint injuries occur when objects to be lifted are too heavy or awkward, are lifted improperly, or in areas where access is restricted.

Lifting tasks which are awkward and repetitive, even if involving only light objects, can lead to nerve and joint damage.

### Recognition and Hazard Assessment

The need for manual lifting must be identified as a physical hazard when project tasks specifically require manual handling or use of heavy equipment, and the following safe lifting techniques must be instituted:

- Plan any lifting task, noting:
  - **Contact hazards.** Check each object before lifting for presence of splinters, slivers, sharp edges or parts, cracks and loose joints, signs of biological hazards, and chemical or radioactive material contamination.
  - **Weight of object.** Unless involved in weight training, recommended safe lifting weights for an average man or woman are 50 and 35 pounds, respectively.
  - **Size and shape of object.** Large and oddly shaped objects are more difficult to lift, even within safe weight limits, due to imbalanced center of gravity.
  - **Area in which lifting is to be done.** Check for pinch points such as other objects close by and ensure there is room for safe lifting.
  - **Conditions under which lifting is to be accomplished.** Check for wet or slippery surfaces. Also consider level of protection to be used. Level B or A protection may add up to 40 lbs. To be lifted, as well as restricting range of motion and adding to area restriction by increasing bulk.

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- **Route to be traveled, if lifting includes carrying.** Check walking and working surfaces for slip and trip hazards, note ramps, changes in level of elevation, and ladders or stairways that need to be negotiated.

### **Prevention and Protection Programs**

- Before lifting, identify the potential for contact hazards on objects to be lifted. Check each object before lifting, remove any noted hazards as feasible, and wear gloves (cotton, at a minimum, or leather, kevlar, or chemical resistant material, depending on the nature of the hazard).
- Avoid contact with, or cover cracks or loose joints to reduce hazards of pinching.
- Workers must know their lifting limitations, plan before lifting, keep themselves in good physical condition, and get help if uncertain that they can lift safely. Managers must plan and allow for safe lifting.
- When lifting an object from the floor:
  - Determine that the object is within the safe weight limit.
  - Check for contact hazards.
  - Walk the intended route of travel to identify and remove slip and fall hazards.
  - Identify changes in elevation, steps, ramps, stairs and ladders that must be negotiated.
- To lift square or rectangular objects:
  - Avoid reaching as you lift.
  - Set feet firmly, placing one foot alongside the load and the other slightly behind the load.
  - Keep objects close to the body.
  - Squat in front of the load.
  - Grasp one of the top corners away from the body and the opposite bottom corner closest to the body.
  - Tilt the object slightly away from the body, tilt forward at the hips, keep the back straight and tuck in the chin.
  - Straighten the legs, keeping the spine straight, pull the object into the body and stand up slowly and evenly without jerking or twisting.
  - If turning or change of direction is required, turn with feet without twisting the torso and step in the direction of travel

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- To set an object down, reverse the sequence, being sure not to trap the bottom hand between the object and the surface on which the object is set.

Workers must be trained and have the opportunity to use the above steps with lighter objects before performing heavy lifting. **For odd-shaped objects, the only modification needed should be hand-hold position.** When two or more persons are lifting, have a plan and a set of signals so lifting occurs simultaneously.

Do not carry objects in a manner which obstructs vision in the line of travel.

Carry objects so one hand is free to hold the handrail on stairs and that there is an unobstructed view of footing. Carry objects in a manner to permit use of both hands while climbing a ladder.

### **Manual Handling of Heavy Objects**

#### **Hazard**

Manual maneuvering or handling of heavy objects without actually lifting is often required for hazardous materials and on Resource Conservation and Recovery Act (RCRA) facilities and construction sites. Manual handling of heavy objects, even when not actually lifting, can pose the same hazards as lifting including cuts, pinches, bruises, crushing, muscle and joint strain, and contact with hazardous materials and biological hazards.

#### **Recognition and Risk Assessment**

The need for manual handling of heavy objects must be addressed in the planning stages of a project Health and Safety Plan (HASP). Drums and other containers which must be maneuvered for access to information or sampling locations, that are inaccessible to mechanical handling equipment, require manual handling and special precautions. When handling of heavy objects does not actually involve lifting, workers can handle heavier objects, even those weighing several hundred pounds, safely if proper techniques are used. In many instances, the procedures involve balancing and taking advantage of the shape of the object.

#### **Prevention and Protection Programs**

Prior to performing manual handling, it must be determined that it can be done safely and that mechanical assistance is infeasible.

Mechanical equipment or assistance such as dollies, carts, come-alongs or rollers are to be used whenever possible. Mechanical assistance must be of proper size, have wheels sized for the terrain, and be designed to prevent pinching or undue stress on wrists. Objects to be moved must be secured to prevent falling and properly balanced to prevent tipping.

The minimum protection for manual handling is heavy cotton or leather gloves, safety boots, and coveralls. Metatarsal guards, chemical protective clothing, and metal mesh or kevlar gloves must be used as risk increases of heavy items falling, hazardous materials contact and sharp edges, splinters or slivers.

Workers must be aware of and work within their weight-handling capabilities.

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Objects to be manually handled must be checked for contact hazards prior to beginning movement, and to ensure handling will not trap hands, arms, legs, or feet between the object and other objects, walls, or railings.

Properly trained personnel may roll heavy objects with a round base such as 55 gallon drums or compressed gas cylinders, if rolling will not damage the structural integrity. Rolling must be controlled by chutes, tag-lines, or other means of limiting acceleration. Use of the legs for pushing and tag-line control of rolled objects must be stressed.

Only properly trained personnel may move cylindrical objects which must remain upright by hand. Cylindrical objects, such as drums that must remain upright, are handled manually by slightly tilting the object, using the legs for control, and balancing the object on the bottom edge. The handler then walks beside the object, with the object tilted toward the body, positioning the hands on the top edge away from the body and moving so they do not cross, thus maintaining balance and a steady controlled forward motion.

Prior to moving cylindrical objects in this way, the route of travel must be walked to identify any changes of elevation, pot holes, or other obstructions that could cause the object to snag, tip, or get out of control.

Flat, square, or rectangular objects are most easily handled using make-shift rollers or skids to break the friction with the resting surface and pushing using the legs.

Revised 11/1999

**GENERAL**

**REFERENCES**

Related FLD OPS:

*FLD02 – Inclement Weather*

*FLD15 – Remote Areas*

**Hazard**

Physical hazards associated with rough terrain include vehicle accidents, falling, slipping, and tripping. Driving vehicles on uneven surfaces creates a possibility of the vehicle rolling, getting stuck in mud or ditches, or of an accident due to flat tires or striking obstacles and other vehicles. Falling is a potential hazard when working near mountain cliffs or steep inclines. Steep surfaces covered with heavy vegetation and undergrowth create tripping hazards. Heavy or downed vegetation can hide holes or breaks in the terrain, which increase risk of falls or vehicle accidents.

**Recognition and Risk Assessment**

Rough terrain complicates work activities and adds or increases risk. In the planning stages of a project, rough terrain must be considered as a physical hazard. Risk assessment is usually accomplished from site history information (i.e., site topography) and onsite by the Site Health and Safety Coordinator (SHSC).

**Hazard Prevention and Protection Programs**

Hazard prevention can be achieved by ensuring regular maintenance is performed on vehicles. In order to minimize accidents, a site surveillance on foot may be required to ensure clear driving paths. The site crew should be alert and observe terrain while walking to minimize slips and falls. Boots that are ankle high or higher should be worn to provide additional support and stability. Vehicle drivers and passengers should wear seatbelts at all times. Fall protection is required when there is a potential for falls.

Personnel should maintain a high level of physical conditioning due to increased body stress and exertion. Personnel should be aware of potential hazards and ensure the availability of first aid supplies and knowledge of the location of the nearest medical assistance.

Revised 11/1999

**GENERAL**

Hazards associated with poor housekeeping include slips, trips, falls, punctures, cuts, and fires.

**REFERENCES**

Related FLD OPS:

*FLD29 – Material Handling*

*FLD33 – Demolition*

*FLD39 – Illumination*

**PROCEDURE**

**Recognition and Risk Assessment**

Good housekeeping is an important element of accident prevention. Good housekeeping should be planned at the beginning of the job and carefully supervised and monitored through to the final clean-up.

Housekeeping requirements must be addressed in the planning stages of a project and safety plan. Risk assessment can be accomplished in the development stages of a project by listing in the site-specific Health and Safety Plan (HASP), good housekeeping requirements and the hazards associated with poor housekeeping (e.g., slips, trips and falls). The SHSC must make decisions on the proper safety procedures and recommend them to the site manager. Each worker must evaluate the risk associated with his or her work and be actively alert to these hazards. Any site worker may stop work if safety procedures are not followed or the risk is too great.

**Prevention and Protection Programs**

Poor housekeeping can be prevented by following the three steps described below:

1. Plan ahead. A materials storage area which has been planned is more orderly than one which has developed haphazardly.
2. Assign responsibilities. If the size of the job and work force merit, a person should be assigned specific responsibility for clean up. Ideally, each individual should pick up his or her work area and help keep the site neat.
3. Implement the program. Housekeeping must be part of the daily routine, with clean-up being a continuous procedure.

Accidents caused by poor housekeeping can be prevented by adherence to the following rules.

Lunch areas should be kept clear of empty bottles, containers, and papers. Trash disposal cans should be provided. An effective means of preventing litter is the provision of suitable receptacles for hazardous waste, as well as nonhazardous waste.

Revised 11/1999

Accumulation of flammable and combustible liquids on floors, walls, and other areas, is prohibited. All spills of flammable and combustible liquids must be cleaned up immediately. Combustible waste such as soiled rags and paper is to be stored in a safe place (such as a covered metal container) and disposed of regularly.

WESTON project managers and WESTON subcontractors should provide sufficient personnel and equipment to ensure compliance with all housekeeping requirements.

Work will not be allowed in areas that do not comply with the requirements of this section.

The SHSC and WESTON subcontractors will inspect the work area daily for adequate housekeeping and record unsatisfactory findings on the daily inspection report.

If applicable, the decontamination line must be kept neat and free of debris.

Adequate lighting should be provided in or around all work areas, passageways, stairs, ladders, and other areas used by personnel.

All stairways, passageways, gangways, and accessways shall be kept free of materials, supplies, and obstructions at all times.

Loose or light material should not be stored or left on roofs or floors that are not enclosed, unless it is safely secured.

Tools, materials, extension cords, hoses, or debris are to be used, disposed of, and stored so as not to cause a tripping or other hazard.

Tools, materials, and equipment subject to displacement or falling should be adequately secured.

Empty bags that contained lime, cement, and other dust-producing materials should be removed periodically, as specified by the designated authority.

Protruding nails in scrap boards, planks, and timbers should be removed, hammered in, or bent over flush with the wood, unless placed in containers or trucks for removal.

Walkways, runways, and sidewalks should be kept clear of excavated material or other obstructions and no sidewalks should be undermined unless shored to carry a minimum live load of 125 pounds per square foot.

Containers should be provided for storing or carrying rivets, bolts, and drift pins, and secured against accidental displacement when aloft.

When rivet heads are knocked off or backed out, they should be prevented from falling.

Form and scrap lumber and debris should be cleared from work areas, passageways, and stairs in and around building storage yards and other structures.

All storage and construction sites should be kept free of the accumulation of combustible materials.

Revised 11/1999

All materials should be maintained in neat stockpiles for ease of access. Aisles and walkways should be kept clear of loose materials and tools.

Areas prone to weeds and grass should be kept mowed. A standard procedure should be established for cleanup of such areas, as specified by the SHSC.

Rubbish, brush, long grass, or other combustible material must be kept from areas where flammable and combustible liquids are stored, handled, or processed.

Revised 11/1999

**GENERAL**

**REFERENCES**

Related FLD OPS:

*FLD15 – Remote Areas*

*FLD39 – Illumination*

**PROCEDURE**

When WESTON's responsibilities include site control, one aspect to be addressed is security, or maintaining control of access to the site. Contingency plans are required to deal with unauthorized entry. Inquisitive and/or hostile persons may interfere with the monitoring/sampling effort, jeopardizing their safety, as well as the safety of the field team.

**Recognition and Risk Assessment**

In the planning stages of a project and safety plan, the potential for security problems must be considered as physical hazards in the site-specific Health and Safety Plan (HASP). Risk assessment can be accomplished in the development stages of a project by listing in the HASP the most likely security problems that may be encountered. The SHSC must make decisions on the proper safety procedures and recommend them to the site manager. Each worker must evaluate the risk associated with his or her work and be actively alert to these hazards. Any site worker may stop work if safety procedures are not followed or the risk is too great.

Entry to a site by unauthorized persons presents risks to the persons entering and to WESTON personnel who may have to interact with such individuals. In many cases, the unauthorized entry is accidental or unintentional; however, contingency plans must also include procedures for instances when unauthorized entry is deliberate or for purposes which could pose a threat to site personnel.

During the assessment of risk for each site, security problems must be identified. The contingency plan should identify ways to prevent and respond to security problems.

Security problems may arise from the site neighborhood due to:

- Socio-economic factors
- Client/neighbor relations
- Client/labor relations
- Poor lighting
- Remoteness and size of site
- Value of equipment and materials
- Sampling equipment tampering

## **Prevention and Protection Program**

Prevention programs are an integral portion of a Security Contingency Plan. An effective preventative measure is to inform all interested parties of the site activities. An attempt should be made to notify state and local police, the fire department, and any local/state government officials of the project's purpose and scope. This will allow those authorities to answer questions posed to them by local residents and the media by preparing statements on the project's purpose or by informing the public where to call for further information. This will alleviate the problem of work stoppage due to field personnel answering questions.

One must ensure that the client understands and approves of any information released. In most cases, the liaison should be between the client and the public.

The Security Contingency Plan must:

- Identify the person responsible for implementing the Contingency Plan
- State as the first priority the safety of WESTON personnel
- Be designed to minimize the potential for confrontation and to obtain security assistance as quickly as possible
- Assign the enforcement of security functions to properly trained and authorized or bonded agencies
- Establish a communication procedure for obtaining assistance
- Be communicated to site personnel

Security Problem Prevention measures include:

- Community relations programs
- Visible security precautions (e.g., fences, "keep out" signs)
- Carefully defined rules/requirements for authorizing site access
- Clearly delineated access points and barriers around work area
- Vigilance by all site personnel
- Adequate lighting
- Working in pairs or teams in sensitive areas
- Locking and storing equipment securely
- Using discretion in discussions and conversations when off-site
- Working to avoid confrontation

In short, security prevention includes not advertising activities or inviting intrusion. Telephone numbers and instructions for obtaining security assistance must be clearly posted onsite.

Personnel onsite must always have access to communications. These communications may be to additional onsite personnel or, in certain situations, communications by team members to outside response agencies may be necessary.

Revised 11/1999

**GENERAL**

**REFERENCES**

Related FLD OPS:

*FLD01 – Noise Protection*

*FLD02 – Inclement Weather*

**PROCEDURE**

Traffic presents hazards in two ways: 1) when site workers are working close to roadways, the potential exists to be hit by oncoming traffic, and 2) driving to, from, and on the site poses a potential accident hazard.

**Recognition and Risk Assessment**

In the planning stages of a project and safety plan, the potential for traffic hazards must be considered as physical hazards in the site-specific Health and Safety Plan (HASP). Risk assessment can be accomplished in the development stages of a project by listing in the HASP the most likely traffic hazards that may occur. The SHSC must make decisions on the proper safety procedures and recommend them to the Site manager. Each worker must evaluate the risk associated with his or her work and be actively alert to these hazards. Any site worker may stop work if safety procedures are not followed or the risk is too great.

**Prevention and Protection Program**

**Roadway Workers**

Roadway workers should be aware of their location in reference to roadways and avoid working close to traffic. Workers near roadways must wear reflective vests.

The following guidance should be used in planning work that will be adjacent to or within roadways. In all cases, the local police department or transportation department must be consulted in order to comply with applicable requirements.

When open highway conditions prevail on approach to the work site, advance warning signs should be placed approximately 1500 feet in advance of the condition to which they are calling attention. Where a series of advance warning signs are used, the warning signs nearest the work site should be placed approximately 500 feet from the point of restriction, with additional signs at 500- to 1000-foot intervals. On expressway and limited access facilities, the advance warning distance should be increased to one-half mile or more; on city streets, where more restrictive conditions generally prevail, advanced warning should appear on the approach to the work area. Signs in the immediate vicinity of the work may be placed at closer spacings.

Revised 11/1999

Flag persons may be required to control the speed of nearby traffic. Lights should be provided to mark flag person stations and barricading at night. Barricading is extended to the point where it is visible to approaching traffic.

Signs on fixed supports are usually mounted on a single post, although those wider than 36 inches or larger than 10 square feet in area should generally be mounted on two posts. Signs mounted on portable supports are suitable for temporary conditions.

## **Drivers**

All drivers will be licensed, regardless of whether they are operating on or off public highways. A government driver's license is required for WESTON employees and WESTON subcontractors if a government vehicle will be used.

If drivers are operating across state lines, they should be familiar with laws governing traffic in states in which they will operate. All traffic rules and regulations, and all traffic control signs and devices should be obeyed. All operators are required to stay within posted speed limits at all times.

Drivers are required to make a daily inspection of their vehicles. The check should include steering, brakes, mirrors, lights, horn, tires, and windshield wipers. Any special safety items, such as back-up alarms, should also be checked to ensure safe operation. Drivers should be required to report all defects, and repairs should be made promptly.

Drivers should make a visual check around the vehicle to ensure no objects and personnel are in the vehicle's path before moving the vehicle.

Drivers should become familiar with all controls before operating an unfamiliar vehicle.

Drivers should operate vehicles defensively and exercise special care when driving on unfamiliar roads, at night, and in inclement weather.

Drivers should give pedestrians the right of way.

Off-highway operation may require extra precautions to prevent shifting of load when crossing rough terrain.

Trucks should be backed under the direction of a signal person if the operator does not have a clear view of the area to the rear of the vehicle.

Windshields, rear-view mirrors, and lights should be kept clean.

Based upon the size of the vehicle, or if specific quantities of hazardous materials are transported, the driver may be required to have a Commercial Driver's License (CDL). Refer to The Motor Vehicle Operating Practice.

Revised 11/1999

## **Transporting Personnel**

The SHSC will ensure that seat belts are installed and functional on all vehicles used by WESTON personnel and WESTON subcontractors, and that all passengers use them. The use of seat belts by all personnel is mandatory.

Some convenient means of mounting and dismounting the truck should be provided.

Personnel should be required to ride within the space provided, never on running boards, fenders, bumpers, or atop cabs.

Adequate wind protection should be provided for long distance trips, and during cold weather.

Personnel are not allowed to ride on the outside or back (such as in the bed of a pickup truck) of vehicles.

## **Transporting Materials**

Materials loaded should be within the safe weight limit for the truck, and should not project beyond the truck body.

While being loaded, truck wheels should be properly blocked.

Trucks operated on public highways should conform to weight and clearance limitations of bridges, powerlines, overhead structures, and other restrictions.

No person should be permitted to remain in or on a truck being loaded by excavating equipment or cranes unless the cab is adequately protected against impact.

## **Pedestrian Protection Program**

Pedestrians on-site should use discretion when crossing the streets or working near traffic. Pedestrians should use sidewalks whenever possible and not step from curbs unless vehicles are at a safe distance.

## **Vehicle Maintenance**

Operators should immediately report any damage or failure of parts and accessories to the SHSC. It is advantageous to have road flares, fire extinguishers, and other safety equipment on the vehicle at all times.

Vehicles should not be fueled from open cans or by other makeshift methods, as there is great danger of flash fire from hot engines.

Engines should be shut off while fueling.

Revised 11/1999

## **FLD 22      HEAVY EQUIPMENT OPERATION**

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### **GENERAL**

### **REFERENCES**

Related FLD OPS:

*FLD23 – Cranes/Lifting Equipment*

*FLD24 – Aerial Lifts/Manlifts*

*FLD34 – Utilities*

*FLD35 – Electrical Safety*

### **PROCEDURE**

#### **Machinery and Mechanized Equipment Safety**

Before any machinery or mechanized equipment is placed in use, it will be inspected and tested by a competent mechanic and certified to be in safe operating condition.

The employer will designate a competent person to be responsible for the inspection of all machinery and equipment daily and during use to make sure it is in safe operating condition. Tests will be made at the beginning of each shift during which the equipment is to be used to determine that the brakes and operating systems are in proper working condition.

Preventative maintenance procedures recommended by the manufacturer will be followed.

Any machinery or equipment found to be unsafe will be deadlined and its use prohibited until unsafe conditions have been corrected.

Inspections or determinations of road conditions and structures will be made in advance to ensure that clearances and load capacities are safe for the passing or placement of any machinery or equipment.

Machinery and mechanized equipment will be operated only by designated personnel. Equipment deficiencies observed at any time that affect safe operation will be corrected before continuing operation.

Seats or equal protection will be provided for each person required to ride on equipment.

Getting off or on any equipment while it is in motion is prohibited.

Machinery or equipment requiring an operator will not be permitted to run unattended.

Machinery or equipment will not be operated in a manner that will endanger persons or property, nor will the safe operating speeds or loads be exceeded.

Revised 11/1999

All machinery or equipment will be shut down and positive means taken to prevent its operation while repairs or manual lubrications are being done. The only exemption is equipment designed to be serviced while running.

All repairs on machinery or equipment will be made at a location that will provide protection from traffic for repair persons.

Heavy machinery and equipment, or parts thereof, that are suspended or held apart by slings, hoists, or jacks also will be substantially blocked or cribbed before personnel are permitted to work underneath or between them.

Bulldozer and scraper blades, end-loader buckets, dump bodies, and similar equipment will be either fully lowered or blocked when being repaired or when not in use. All controls will be in a neutral position, with the engines stopped and brakes set, unless work being performed on the machine requires otherwise.

Stationary machinery and equipment will be placed on a firm foundation and secured before being operated.

All points requiring lubrication during operation will have fittings so located or guarded to be accessible without hazardous exposure.

When necessary, all mobile equipment and the operating area will be adequately illuminated while work is in progress.

Mechanized equipment will be shut down prior to and during fueling operations. Closed systems, with automatic shutoff that will prevent spillage if connections are broken, may be used to fuel diesel powered equipment left running.

All towing devices used on any combinations of equipment will be securely mounted and structurally adequate for the weight drawn.

Persons will not be permitted to get between a piece of towing equipment and the item being towed until the towing equipment has come to a complete stop.

All equipment with windshields will be equipped with powered wipers. Vehicles that operate under conditions that cause fogging or frosting of windshields will be equipped with operable defogging or defrosting devices.

All equipment left unattended at night, adjacent to a highway in normal use, or adjacent to construction areas where work is in progress, will have lights or reflectors, or barricades equipped with lights or reflectors, to identify the location of the equipment.

Whenever the equipment is parked, the parking brake will be set. Equipment parked on inclines will have the wheels chocked or track mechanism blocked and the parking brake set.

Revised 11/1999

Equipment such as lift trucks and stackers will have the rated capacity posted on the vehicle so as to be clearly visible to the operator. When auxiliary removable counterweights are provided by the manufacturer, corresponding alternate rated capacities also will be clearly shown on the vehicle. The ratings will not be exceeded.

Steering or spinner knobs will not be attached to the steering wheel unless the steering mechanism prevents road reactions from causing the steering handwheel to spin. When permitted, the steering knob will be mounted within the periphery of the wheel.

All industrial trucks in use will meet the requirements of design, construction, stability, inspection, testing, maintenance, and operation, defined in American National Standards Institute (ANSI) B56.1, Safety Standards for Powered Industrial Trucks.

The installation of live booms on material and personnel hoists is prohibited.

The controls of loaders, excavators, or similar equipment with folding booms or lift arms will not be operated from a ground position unless so designed.

Personnel will not work or pass under the buckets or booms of loaders in operation.

Cranes and any other equipment used for lifting must be inspected as required and records of inspection must be maintained.

## **Drill Rigs**

WESTON has adopted the Drilling Safety Guide prepared by the Diamond Core Drilling Manufacturers Association and the National Drilling Contractors Association, as published by the National Drilling Federation, as the basic safety programs for all activities involving drill rigs or similar apparatus for the purpose of well installation or soil borings.

## **FLD 32      FIRE EXTINGUISHERS REQUIRED AND REQUIREMENTS**

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### **GENERAL**

### **REFERENCES**

Related FLD OPS:

*FLD09 – Hot Work (Permits)*

*FLD21 – Explosives*

*FLD22 – Heavy Equipment Operation*

*FLD30 – Hazardous Materials Use and Storage*

*FLD31 – Fire Prevention/Protection/Response Plans*

*FLD36 – Welding/Cutting/Burning*

### **PROCEDURE**

Fire extinguishers appropriate in size and classification shall be present, readily accessible, and ready for use in all areas where there is potential for fires.

Fire extinguishers must be used in conjunction with an emergency response or contingency plan.

Health and Safety Plans must identify number, type, and location of all fire extinguishers related to a specific project.

Revised 11/1999

## **FLD 34      UTILITIES**

### **PURPOSE**

This program provides requirements for identification, location, and avoidance of underground utilities, appurtenances, and structures during intrusive activities. The program also addresses actions to be taken in response to encountering or contacting underground utilities. These requirements are applicable to all Weston Solutions, Inc. (WESTON) operations. The procedures address the requirements and recommendations for identifying and locating, working around, and encountering or contacting underground utilities.

### **DEFINITIONS**

#### **Aggressive Methods**

The use of mechanized equipment such as excavators, backhoes, drill rigs, directional drilling, road saws, etc. Non-Aggressive methods involve the use of manual methods such as hand digging with shovels and air/hydro/vacuum methods.

#### **Buffer Zone**

As defined in this procedure, the area around a utility where only non-aggressive excavation methods may be utilized, unless specific conditions are met.

The definition cited above, and the excavation requirements and restrictions associated with it, will vary depending on the particular state regulations. WESTON requires the imposition of a four-foot Buffer Zone on all sides of the utility as measured from the outside edges of the utility, both horizontally and vertically. Since most jurisdictions recognize Buffer Zones which vary somewhere in the range of 18 to 36 inches, this distance must be verified by consulting the applicable state regulations before excavating so that adjustments to surface markings can be made to achieve the WESTON-required four-foot buffer zone.

Referred to as the "Tolerance Zone", "Safety Zone", or "Approximate Location of Underground Utilities" in some jurisdictions.

#### **Competent Person**

A Competent Person has the ability to recognize hazards associated with underground utilities and the authority to stop or direct operations to ensure the safety of personnel and conformance with this procedure. The Competent Person has an understanding of this procedure, and the "One-Call" system requirements for the jurisdiction where excavation is occurring. The Competent Person must be capable of notifying One-Call agencies and maintaining and tracking One-Call Locate Numbers. Additionally, they must have knowledge of methods and work practices for utility identification, avoidance, and protection.

The designation of a Competent Person will be made by the Site or Project Manager with the concurrence of the Division EHS Manager.

## **De-Energize**

As applicable to a utility, to physically eliminate and/or prevent the presence, transmission, flow, or release of energy or materials which may cause harm to personnel or property.

## **Excavation (Intrusive Activity)**

An operation for the purpose of movement or removal of earth, rock, or the materials in the ground, including but not limited to; digging, blasting, augering, test boring, drilling, pile driving, directional drilling, grading, plowing-in, hammering, pulling-in, jacking-in, trenching, tunneling, structural demolition, milling, scraping, tree and root removal (grubbing), fence or sign post installation. WESTON requires that the designated One-Call Agency for the applicable jurisdiction be contacted any time an intrusive activity is planned.

## **Jurisdiction**

The authority having legal jurisdiction relative to regulations and requirements for notification of excavation activities and associated identification and marking. In the United States, the states have jurisdiction, and most consider the regulations applicable when excavation is to be performed in any location, including any public or private way, any company right-of-way or easement, or any public or privately owned land or way. Note: One caveat to remember – Jurisdiction may flow to the “owner” on private or government-owned property because the State One-Call Agencies may not clear utilities on such facilities.

## **Locate**

To indicate the existence of a utility by establishing a mark through the use of flags, pins, stakes, paint, or some other customary manner, that approximately determines the location of a line or facility.

## **Locate Request**

A communication between an entity performing intrusive activities and a utility marking Agency (One-Call, etc).

## **Observer**

The person assigned to visually monitor and, as needed, signal the operator during mechanized intrusive activity when the activity is occurring within four feet of the outside edge of the buffer zone. This person remains in close communication with the equipment operator(s) and will stop the activity if needed.

## **One-Call Agency**

An entity that administers a system through which a person can notify owners/operators of underground lines or utilities of the intent to perform intrusive activities in proposed public areas.

## **Positive Response**

Communication with the entity performing intrusive activities, prior to the activity, to ensure that all contacted (typically via the One-Call Agency) owner/operators have located and marked the underground utilities.

## **Potholing**

The practice of exposing an underground facility by safe, non-aggressive excavation methods in order to ascertain the precise horizontal and vertical position and orientation of underground lines or utilities.

## **Underground Utility**

An underground or submerged conductor, pipe, or structure used in providing electric or communications service (including but not limited to, traffic control loops and similar underground or submerged devices), or an underground or submerged pipe used in carrying, providing, or gathering gas, oil or oil product, sewage, storm drainage, water or other liquid service (including, but not limited to, irrigation systems), and appurtenances thereto. As used in this procedure, utility includes all underground appurtenances and structures.

The following are examples of the types of underground utilities that may be present in a given location:

- Natural gas pipelines
- High voltage electric cables
- Water pipelines
- Fiber optic telecommunications lines
- Telephone cable lines
- Steam pipelines
- Gasoline, oil, or other fuels
- Sewer pipelines
- Vents for sewer and gasoline/diesel fueling systems
- Underground Storage Tanks (USTs)
- Abandoned underground structures containing hazardous materials, hazardous wastes, and radioactive materials

**Note:** Electrical and pressurized mechanical underground utilities that are not energized shall be considered as applicable to the requirements of this procedure until they are disconnected, de-energized removed and/or protected by a lockout/tagout system approved by WESTON.

## **Underground Utility Owner**

Any person, utility, municipality, authority, political subdivision or other person or entity who owns, operates, or controls the operation of an underground line/facility.

## **White Lining**

The practice whereby the entity, which intends to perform intrusive activities, pre-marks the site with an outline of the area where intrusive activities will occur. This involves the use of white paint, flags, stakes, or a combination thereof to mark the extent of where work is to be performed. The marking may vary depending on what intrusive activities are to be conducted. For example, for general excavation, an areal outline of the excavation shall be marked, while for drilling, the individual boreholes shall be marked. Studies have shown that pre-marking is a practice that does prevent utility contact incidents. Check State or local regulatory requirements to ensure compliance.

## **RESPONSIBILITIES**

### **Competent Person**

The Competent Person shall be responsible for:

- Obtaining a copy of, and understanding the applicable regulations for the state of jurisdiction where the excavation activities are to be performed.
- Contacting the appropriate One-Call Agency or private locating service, as applicable.
- Recording One-Call locate numbers.
- If necessary, renewing One-Call locate numbers before expiration.
- Ensuring that white-lining of the area to be excavated is performed; if another equal or better protective measure is necessary because of the nature of the work, state/local regulation or client requirements, the Health and Safety Plan should be amended to reflect the change.
- Ensuring that a “positive response” has been received from every utility owner/operator identified by the One-Call Agency and that they have located their underground utilities and have appropriately marked any potential conflicts with the areas of planned intrusive activities prior to the start of intrusive work.
- Completion of the Underground Utilities Locating and Marking Checklist (Attachment A) and the Underground Utilities Management Checklist (Attachment B).
- Reviewing applicable Activity Hazard Analyses (AHAs) with all project members before work begins.
- Conducting training on communication protocols to be used by the excavation observer and equipment operator.
- Ensuring Implementation of appropriate work practices during intrusive activities (including maintaining the prescribed buffer zone for use of aggressive methods).
- Conducting daily or more frequent (due to changes in conditions) inspections of the excavation area to make sure that all markings are intact.

- Maintaining required records (see Attachments A & B).
- Providing the Site Health and Safety Coordinator (SHSC) with all required documentation on a daily basis.

### **Observer**

Whenever intrusive operations with mechanized equipment are being conducted within four feet of the outside edge of the buffer zone, horizontally and vertically, an observer must be assigned to monitor the activities. The observer is responsible for:

- Maintaining a safe vantage point relative to digging machinery, excavation edge and proximity to the hazard posed by the utility.
- Observing the operation to ensure that the operator stops operations if utilities are observed.
- Reviewing hand signals and other forms of communication with the operator.
- Properly signaling the operator.
- Stopping the operation immediately if the observer's attention must be diverted even momentarily.
- Stopping the operation immediately if a hand signal or other directive is not followed. Operations will not resume until the observer and operator mutually agree that the reason(s) for not complying with the directive(s) are/is identified and fully corrected.
- Maintaining required records, such as logbook entries, or other, as requested by line management.

### **Line Management**

The Project Manager (PM) or Site Manager (SM) {e.g., the on-site manager} shall be responsible for:

- Establishing the site culture with the assistance of the Site Health and Safety Coordinator that ensures compliance with this procedure.
- Providing the necessary resources for compliance with this procedure.
- Designating Competent Personnel in consultation with the Division EHS Manager prior to the start of work.

### **Environmental, Health and Safety Personnel**

The Site Health and Safety Coordinator (SHSC) shall be responsible for:

- Providing oversight on the implementation of the requirements contained in this procedure.
- Consulting with the PM, SM and Competent Person on underground utility issues.

## **PROCEDURE**

The following sections provide the requirements and recommendations of this procedure, which are intended to prevent injury to personnel, damage to infrastructure, and associated indirect effects associated with encountering or contacting underground utilities during the execution of intrusive work. Underground utilities present multiple potential hazards that must be recognized before and during work which occurs near them, therefore, this procedure is divided into sections addressing underground utility identification and location, working around or near underground utilities, and actions to be taken in the event that underground utilities are encountered or contacted. Hazards that may be presented by underground utilities include explosion and fire, electrocution, toxic exposures, pathogens, and drowning.

### **Identifying and Locating Underground Utilities**

The possibility of the existence of underground utilities (*note: also consider the impact of any subsurface mining activities*) must be evaluated as early as possible in the planning phase for any project, which involves intrusive activities. The following sections describe various methods for identifying and locating utilities on a site. Plans should be verified during the readiness review. The *Underground Utilities Locating and Marking Checklist* (Attachment A) and the *Underground Utilities Management Checklist* (Attachment B) must be completed before any activities meeting the definition of excavation are conducted. Attachment A is intended to be used as a guide during the process of locating and marking utilities in the area to be excavated. Attachment B is intended to be used as a guide in the overall process of underground utilities management during the course of the project. **Note:** Attachments A and B or their equivalents must be used to document compliance with this operating procedure and will be subject to audit.

*All underground utilities on a site involving excavation must be located and identified before intrusive activities commence, by at least two of the following:*

- *The Utility Owner*
- *A Private or Public Utility Locating Service*
- *Review of the most current utility drawing, maps or other available records by an approved WESTON Competent Person*
- *Use of utility locating technology by a WESTON Competent Person or Subcontractor*

### **Pre-Planning and the Site HASP**

The Site-Specific Health and Safety Plan (HASP) developed for the project must:

- Identify the location and types of underground utilities that are believed to be present on the site.
- Reference this procedure (FLD 34), and describe how it will be implemented on the project.
- Contain an Activity Hazard Analysis in which the hazards associated with underground utilities are identified, as well as the measures used to control them.
- Contain, as an appendix, a copy of the applicable regulations from the state of jurisdiction where excavation activities are to be performed. These can usually be obtained via the Internet.

- Contain clear and concise procedures to be followed in the event that contact with underground utilities occurs.
- Address underground utilities and potential associated scenarios in the emergency response section of the HASP.

### **“One-Call” Locating and Marking Services**

Every state has utility marking service programs having various names such as “One-Call”, “Dig-Safe”, “Call-Before-You-Dig”, “Dig-Safely”, and many others. These services will identify the types and locations of any utility that may exist in an area to be excavated, as long as the property is in the public domain.

- The appropriate One-Call service for the jurisdiction where the project is located must be contacted prior to beginning excavation work. The One-Call Agency should be given as detailed a description of the property as possible; address, cross street, utility pole numbers, physical description, etc.
- Notification to the One-Call service shall allow sufficient lead-time for the Agency to mark the utilities before excavation begins. The lead times vary, but range from two to ten days, depending on the state of jurisdiction.
- A complete listing of One-Call agencies and telephone numbers for all states is available in the “*Call-Before-You-Dig Call Center Directory*”, which can be accessed on the Internet at the WebPage (<http://underspace.com/index.htm>) sponsored by “*Underground Focus*” magazine.
- Once notified, the One-Call Agency will provide the contractor with a unique “locate number” or “reference number”. This reference number must be kept in the project files by the Competent Person or designee. Additionally, the reference numbers have expiration dates, which may vary depending on the particular One-Call Agency. The valid period of the locate number and required renew notification date shall be requested from the One-Call Agency.
- On a project with multiple contractors, each contractor must request a separate locate number. Under no circumstances will any other contractor or entity be allowed to “work under our locate number”. Subcontractors to WESTON may excavate under the locate number secured by WESTON, provided that they are excavating within the area which was previously white-lined by WESTON and subsequently marked. **However, the One-Call Agency must be contacted and notified of this arrangement so that the subcontractor can be recorded as working under the existing locate number.** If a WESTON subcontractor will be excavating in an area not white-lined by WESTON, then the WESTON subcontractor must request a new locate. **Note: State and local requirements must be checked for local application of this procedure.**
- The area where work is to be performed shall be white-lined by WESTON personnel before the locating service goes to the site.
- It is good practice to arrange a pre-excavation meeting at the project site with the personnel performing the utility location and marking. This meeting will facilitate communications, coordinate the marking with actual excavation, and assure identification of high-priority utilities.

- The One-Call Agency should provide the identities of the utility owners that will be notified of the locate request. This information shall be recorded on the Underground Utility Locating and Marking Checklist (Appendix A) and maintained in the project files. The contact person and phone number for each utility owner shall also be recorded.
- The utility owners should provide a "positive response" relative to the locate request, which can consist of two types of action by the utility owner. The facility owner or operator is required to 1) mark it's underground utilities with stakes, paint, or flags, or 2) notify the excavator that the utility owner/operator has no underground utilities in the area of the excavation.
- The positive responses shall be recorded on the Underground Utility Locating and Marking Checklist (Appendix A) and crosschecked with the list of utility owners that the One-Call Agency stated that they would notify. If it is discovered that a utility owner has not provided a positive response, then the One-Call Agency must be notified.
- Excavation shall not be conducted until positive responses have been received from all utility owners identified by the One-Call Agency as having underground utilities on the property.
- Before beginning excavation, the excavator must verify that the location marked was correct, and the distinct, color-coded markings of all utility owners are present.
- Examine the site to check for any visible signs of underground utilities that have not been located and marked such as pedestals, risers, meters, warning signs, manholes, pull boxes, valve boxes, patched asphalt or concrete pavement, areas of subsidence, fresh sod or grass, lack of grass or vegetation, and new trench lines.
- The markings placed by the utility owners should be documented by WESTON using a still, digital, or video camera, whenever practical and reasonable.. The photo-documentation shall be maintained with the project files.
- The markings placed by the utility owners or marking services shall follow the American Public Works Association Uniform Color Code as described in ANSI Standard Z 535.1. This code follows:

#### American Public Works Association Uniform Color Code

Red		Electric Power Lines, Cables, Conduit
Orange		Communications, Telephone, Cable TV
Yellow		Gas, Oil, Steam, Petroleum or Gaseous Materials
Green		Sewers and Drains
Blue		Potable Water Systems
Purple		Reclaimed Water, Irrigation, Slurry Lines
Pink		Temporary Survey Markings
White		Proposed Excavation

**Note:** Unless otherwise specified in the utility clearance, such clearance will not be considered valid after 30 days from the date it was issued.

### **Private Utility Locating and Marking Services**

- **One-Call agencies arrange for the identification and marking of underground utilities only on public property, up to the point of contact with private property.** In the event that activities are to be conducted on non-public properties, the presence, location, depth, and orientation of all underground utilities shall be ascertained through records review, including any site plot plans, utility layout plans, and as-built drawings available from the property owner, as well as through interviews with knowledgeable personnel associated with the property. Additionally, the information gathered from these sources shall be verified by physical detection methods (non-aggressive), performance of a geophysical survey, or by procuring the services of a private utility locating and marking service. If any detection methods are to be self-performed, the requirements within this FLD must be followed. **A list of vendors providing this service can be found in the “*Network of Underground Damage Prevention Professionals*” which can be accessed on the Internet at the “*Underspace*” WebPage (<http://underspace.com/index.htm>).**

### **Self-Performance of Utility Locating and Marking**

The techniques and instruments used to locate and characterize underground utilities can be extremely complicated and difficult to use effectively. Additionally, interpretation of the data generated by this instrumentation can be difficult. The utility marking services, as previously described are staffed by well-trained, experienced professionals who perform locating activities on a regular basis. For these reasons, it is most desirable that these professional services are used for utility location and marking on projects.

- In some instances, such as long-term projects where excavation is a primary task, and the presence of underground utilities is extensive, it may be prudent to self-perform locating and marking activities.
- If locating and marking is to be self-performed, all personnel using instrumentation will be trained on the use of the equipment that will be used, and the interpretation of the data.
- There are variety of locating methods which may be utilized for self-performance of utility locating as categorized below:
  - Magnetic field-based locators or path tracers
  - Buried electronic marker systems (EMS)
  - Ground penetration radar-based buried –structure detectors
  - Acoustics-based plastic pipe locators
  - Active probes, beacons, or sondes for non-metallic pipes
  - Magnetic polyethylene pipe
- Before self-performing any underground utility locating on a project, approval must be obtained from the appropriate WESTON Division EHS Manager or the Director, Corporate EHS and QA.

## **Working Near or Around Underground Utilities**

After the site has been properly evaluated for the presence of underground utilities, intrusive activities may begin. Since there is no perfect way of eliminating the hazards presented by underground utilities, an effort must be made to perform the tasks following the direction and guidance as described by the following best practices that should be implemented during the execution of the project.

### **Work Site Review**

Before beginning intrusive activities, a meeting shall be held between all members of the project team. This shall consist of a review of the marked utility locations with the equipment operators, observers, laborers, etc.

### **Preservation of Marks**

During excavation, efforts must be made to preserve the markings placed by the utility owners until they are no longer required. If any markings are obliterated, the One-Call Agency must be contacted for re-marking. No intrusive activities are to take place if markings are not visible.

### **Excavation Observer**

Whenever intrusive operations are being conducted within four feet of the edge of the buffer zone, an observer must be assigned to monitor the activities. The observer will be designated each day, and a review of hand signals and other forms of communication between the observer and operator will be conducted. The directives of the observer will be followed precisely and immediately by those operating equipment.

### **Excavation Within The Buffer Zone**

Performing intrusive activities within the buffer zone requires careful adherence to proper guidelines and procedures to minimize the risk of contact with underground utilities.

The purpose of the buffer zone is to designate and define an area where careful, prudent, and reasonable excavation practices are to be used to prevent contact with underground utilities. However, there may be occasions where it is necessary to perform aggressive excavation methods in this designated area.

The boundaries of the buffer zone will be observed at all times during intrusive activities. Aggressive excavation methods (excavators, backhoes, drill rigs) must be restricted to areas outside of the 4-foot buffer zone unless a special exemption to this requirement is obtained.

Consider whether the objective of the project can be completed without performing intrusive activities in the buffer zone at all. This will greatly reduce the risks presented by performing work in close proximity to underground utilities. If after consideration, the determination is made that intrusive activities in the buffer zone are necessary, then a formal exemption request shall be made to the Division EHS Manager according to the guidelines below.

A request to utilize aggressive excavation methods in the buffer zone may be made if:

- There is no other appropriate and reasonable alternative to using aggressive methods in the buffer zone; and
- The utility has been de-energized (and purged if necessary), verified as de-energized, and locked-out;

Or

The depth and orientation of the utility has been adequately and visually determined through the use of non-aggressive methods such as air/hydro/vacuum excavation, potholing, probing, hand-digging, or a combination thereof; and

- For utilities containing electrical energy, the depth of the existing water table is below the location of the utility; and
- Request for the exemption has been submitted to the appropriate Division EHS Manager and approved.

The following conditions will apply to this request:

- Aggressive methods may be used in the buffer zone only to the extent allowed by the applicable state or other jurisdictional regulations.
- Appropriate physical protection measures for exposed utilities shall be implemented to eliminate the potential for equipment contact with utilities.
- The extent of the project excavation area to be covered by the exemption request must be specified in the request for exemption.
- When evaluating the use of aggressive excavation methods in the buffer zone, the Division EHS Manager will consider the type of utility involved and the associated risk potential. Based on this evaluation, the Division EHS Manager may impose further conditions and requirements. Even if the above exemption conditions are met, the Division EHS Manager has authority to deny the request, the reasons for which will be provided at the time of denial.

Unless exempted according to the above provisions of this procedure, only non-aggressive methods may be used within the buffer zone. Non-aggressive, or non-mechanized equipment is used in order to prevent mechanical contact with underground utilities, which could result in damage to the utility and create the potential for personal injury and property damage. Following are examples of non-aggressive excavation methods:

- Hand-digging
  - Non-conductive hand tools must be used when digging within the buffer zone surrounding underground electrical utilities.
  - If conductive hand tools must be used near electrical lines, then the SHSC shall be consulted to determine additional requirements relative to safe electrical practices, procedures, and equipment.

- Hydro-excavation (water pressure).
- Air excavation (air pressure).
- Vacuum extraction (soil excavation/removal).
- Air excavation/vacuum extraction combination.
- Aggressive methods may be used for the removal of pavement over a utility, if allowed by the state regulations.

### **Protection of Underground Utilities**

It is very important that consideration be given to the protection of underground utilities when performing adjacent intrusive activities. This is necessary not only to prevent physical damage and associated indirect effects, but also to prevent the potential for injury to employees and the public.

- When using aggressive excavation methods within the buffer zone around exposed underground utilities, physical protection must be used as required by OSHA in 29 CFR 1926.651. Basically, this involves creation of a physical barrier between the mechanized operation and the utility. The following are some possible types of physical protective measures:
  - Heavy timbers, similar to swamp mats.
  - Sheets of plywood.
  - Blasting mats.
- Once exposed, underground utilities no longer have the support provided by surrounding soil and may need to be physically supported to prevent shifting, bending, separation, or collapse, which could result in damage to the utility, and possibly personnel. Following are suggested support methods:
  - Timber shoring underneath the utility.
  - Timbers or girders over the top of the excavation fitted with hangers that support the utility.
  - Design by a PE for complicated or large applications.
- Utilities must also be protected from objects that may fall into the excavation such as rocks and equipment. This can be accomplished by following these guidelines:
  - Cast spoils as far away from the excavation as possible. Excavated and loose materials shall be kept two feet from the edge of excavations, as required by OSHA.
  - Relocate large rocks, cobbles, and boulders away from the excavation and sloped spoils piles.
  - When vehicles and machinery are operating adjacent to excavations, warning systems such as soil berms, stop logs or barricades shall be utilized to prevent vehicles from entering the excavation or trench.

- Scaling or barricades shall be used to prevent rock and soils from falling into the excavation.
- Barriers shall be provided to prevent personnel from inadvertently falling into an excavation.

### **De-Energizing Utilities**

Utilities can carry many types of potential energy, including electricity, flowing liquids, liquids under pressure, gasses under pressure, etc. A release, such as may happen if a utility conveyance is compromised, could result in personal injury, property damage, and other indirect effects. If the white lines of the proposed excavation area overlaps or extends into the buffer zone of a known underground utility, then if at all possible, that utility shall be de-energized to physically prevent the transmission, flow, or release of energy. Conversely, if the buffer zone of the known utility lies outside of the white-lined, proposed excavation area, then de-energization is not required.

- The owner of the utility shall be contacted to determine the feasibility and methodology of de-energizing the utility. Plenty of lead-time should be provided for this since it may take utility companies weeks to de-energize some utilities.
- Depending on the utility and the material being conveyed, isolation points which may be suitable for de-energizing include but are not limited to the following:
  - Electrical circuit breakers
  - Slide gate
  - Disconnect switches
  - Piping flanges
  - Other similar devices
- When utilities are de-energized, it must be verified by demonstration. This can be accomplished by testing equipment, switching on a machine or lighting, opening a valve, etc. For any current-carrying electrical equipment, such as cables, electrical panels, etc., successful de-energization must be certified through the use of appropriate electrical testing equipment.
- Whenever a utility is de-energized, a means of ensuring that the energy isolation device and equipment cannot be operated until the device is removed must be provided. Typically, this is achieved by utilizing a lockout device, accompanied by a written tag, that physically controls the configuration of the energy isolation point. Lockout devices include but are not limited to the following:
  - Locks
  - Chains
  - Valve covers
  - Circuit breaker hasps
  - Blind flanges
  - Slip blinds, and
  - Multiple lock hasps
- When de-energizing and locking out of utilities is practiced, the provisions of FLD 42 Lockout/Tagout shall be followed, as applicable.

- In the event that a utility is de-energized, but there is no means of adequately providing a physical locking-out of the utility, then a spotter must be posted at the point of isolation to ensure that the utility is not re-energized. The spotter must be supplied with a communication device such as a site radio.

### **Damage Discovery**

During excavation, utility damage may be discovered which is pre-existing or otherwise not related to a known contact. Disclosure to the utility owner is very important because the possibility of utility failure or endangerment of the surrounding population increases when damage has occurred. The utility may not immediately fail as a result of damage, but the utility owner or operator must be afforded the opportunity to inspect the utility and make a damage assessment and effect repairs if necessary. The following guidance applies:

- Observe and photograph the utility from a safe distance and determine if there is damage. Damage would be all breaks, leaks, nicks, dents, gouges, grooves, or other damages to utility lines, conduits, coatings, or cathodic protection systems.
- The One-Call Agency or private location service must be contacted immediately.
- A Notification of Incident (NOI) Report should be used to document such a discovery.

### **Encountering or Contacting Underground Utilities**

In the event that encountering or contacting an underground utility occurs, it is imperative that the appropriate actions are taken to minimize damage to the utility, prevent personal injury, and minimize indirect effects.

### **Encountering Underground Utilities**

It is possible that underground utilities will be encountered in locations that have previously been "cleared" of having underground utilities by the locating service, or are found outside of the area, which has been marked as having underground utilities. In either case, if this occurs, the following applies:

- Site personnel must be warned and moved to a safe location; equipment engines and ignition sources should be turned off, if possible, as the operator is exiting his/her equipment.
- Intrusive activities must be stopped
- The One-Call Agency or private location service must be contacted immediately
- The PM, SM and SHSC must be notified
- No further intrusive activities may be conducted until:
  - The One-Call Agency/private location service and/or the subject utility owner visit the site;
  - Identification of the utility owner and the type of material/energy being conveyed by the utility has been made; and

- The orientation and depth of the subject utility has been determined and suitably marked.
- A WESTON Notification of Incident (NOI) Report and Investigation form must be completed. The report should be accompanied by photographs clearly showing the marking(s), and the actual location, with a distance gauge to document how far off the mark the utility was encountered.
- Any exceptions to, or deviations from these requirements must be reviewed and approved by the appropriate Division EHS Manager (e.g., abandoned lines at certain Brownfield sites that may be encountered and confirmed as abandoned/not active).

### **Contacting Underground Utilities**

If excavation or other equipment being used for intrusive activities makes contact with an underground utility, the following guidelines apply:

- Site personnel must be warned and moved to a safe location; equipment engines and ignition sources should be turned off, if possible, as the operator is exiting his/her equipment.
- Intrusive activities must be stopped immediately.
- Observe the utility from a safe distance and determine if there is damage. Damage would be all breaks, leaks, nicks, dents, gouges, grooves, scratched coatings, cathodic protection compromise, material leakage, obvious electrical energy.
- Move all personnel to the evacuation meeting point as described in the HASP.

**EXCEPTION:** If an electrical line has been contacted and it is your belief that equipment (such as an excavator) is electrically energized, do not approach the equipment. Order the operator to remain in the equipment until emergency personnel can de-energize the source (unless the equipment is on fire, at which time the operator should jump off of the vehicle and shuffle along the ground to a safe area). Shuffling is required because current flows outward through the soil in a ripple pattern called a power gradient, creating a pattern of high and low potential. Shuffling decreases the chance that these gradients could be bridged, causing current to flow through the body, resulting in electrocution.

- Secure the area to prevent the public from entering.
- Contact emergency responders as specified in the HASP.
- The One-Call Agency or if known, the utility owner must be contacted immediately.
- The PM, SM and SHSC must be notified.
- No further intrusive activities may be conducted until:
  - The utility owner inspects the scene and after repairs, verifies that all danger has passed.
  - The orientation and depth of the subject utility has been determined and suitably marked.

- Permission from the emergency responders to resume work has been given.
- A WESTON Notification of Incident (NOI) Report and Investigation form must be completed. The report should be accompanied by photographs clearly showing the marking(s), and the actual location, with a distance gauge to document how far off the mark the utility was encountered.
- State and Local regulations must be reviewed to determine if reporting to any additional agencies is required.

### **Training**

Competent Persons shall have adequate experience and/or training to carry out the requirements of this procedure.

## **SOURCES OF INFORMATION**

### **Organizations**

- Common Ground Alliance  
<http://www.commongroundalliance.com/wc.dll?cga~toppage>
- Center for Subsurface Strategic Action (CSSA)  
<http://underspace.com/cs/index.htm>
- DigSafely  
<http://www.digsafely.com/digsafely/default.asp>
- National Utility Contractors Association (NUCA)  
<http://www.nuca.com/>
- National Utility Locating Contractors Association (NULCA)  
<http://underspace.com/nu/index.htm>
- Underground Focus Magazine  
<http://underspace.com/uf/index.htm>
- NUCA State Listing of One-Call centers  
<http://www.nuca.com/>
- Utility Safety Magazine  
<http://www.utilitysafety.com/>

### **Vendors and Commercial Sites**

- RadioDetection, Inc. (Detection Instruments)  
<http://www.radiodee.com/>

- Heath Consultants (Detection Instruments)  
<http://www.heathus.com/>
- Ben Meadows Company (Detection Instruments)  
<http://www.benmeadows.com/cgi-bin/SoftCart.exe/index.html?E+scstore>
- So-Deep, Inc. (Complete Utilities Services)  
<http://www.sodeep.com/>
- Concept Engineering Group, Inc. (Air Excavation Equipment)  
<http://www.air-spade.com/index.html>
- Rycom Instruments, Inc. (Detection Instruments)  
<http://www.rycominstruments.com/>
- Schonstedt Instrument Company (Detection Instruments)  
<http://www.schonstedt.com/>
- Forestry Suppliers, Inc. (Fiberglass Probe – “Fiberglass Tile Probe”, Part #77543, Approx. \$20.00, Telephone 800-647-5368)  
<http://www.forestry-suppliers.com/>

## REFERENCES

- Common Ground Study of One-Call Systems and Damage Prevention Best Practices, August, 1999, Sponsored by US DOT.

## ATTACHMENTS

Attachment A – Underground Utilities Locating and Marking Checklist  
Attachment B – Underground Utilities Management Checklist

Revised 8/2002

**FLD 34 UTILITIES - ATTACHMENT A  
UNDERGROUND UTILITY LOCATING AND MARKING CHECKLIST**

**Weston Solutions, Inc.**

**To be Completed by PM and/or "Competent Person"**

**Complete Form as Location/Marking Progresses and Maintain in Site Files**

<b>PROJECT INFORMATION:</b>	Location:
Project Name:	Task/Activity:
Weston Competent Person:	Start Date of Work:
Weston Subcontractor: <input type="checkbox"/> No <input type="checkbox"/> Yes:	Private Locating Service Required: <input type="checkbox"/> Yes <input type="checkbox"/> No
Property Owner:	If Not, Explain:
<b>NOTIFICATION:</b>	
Locating Service Name:	Locating Service Tel. Number:
Date Locating Service Notified:	Locate Ticket Number:
Address of Property to be Marked:	Locate Ticket Expiration Date:
Nearest Intersecting Street:	
Are There Any Utilities on the Properties That the Locating Service Will Not Contact? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Specify:	
Enter Utility Information in Table 1 Below. In Addition to Utility Locating Services, Consult Client, Utility Owners, Drawings, Facility Personnel, Maintenance Personnel, Municipalities, etc.	

**TABLE 1  
ON-SITE UTILITY INFORMATION**

NAME OF UTILITY COMPANY	TYPE OF UTILITY	COLOR CODE	UTILITY PRESENT ON-SITE?	EMERGENCY PHONE NUMBER	DATE MARKS COMPLETED
	Electric	RED			
	Communications, Phone, CATV	ORANGE			
	Gas, Oil, Steam, Petroleum	YELLOW			
	Sewers, Drains	GREEN			
	Potable Water	BLUE			
	Reclaimed Water, Irrigation	PURPLE			
	Temporary Survey Markings	PINK			
To be performed by excavator prior to utility mark-out.	Proposed Excavation	WHITE			

White-Lining Completed? ☐ No Explain: \_\_\_\_\_ ☐ Yes: Date: \_\_\_\_\_ By Whom? \_\_\_\_\_

**LOCATING AND MARKING:**

Have All Utilities Identified in Table 1 Been Marked? ☐ Yes ☐ No (If Not, Contact Locating Service for Resolution) Problem(s) With Markings?

☐ Yes ☐ No ☐ No Marks ☐ Incorrect Location ☐ Too Wide  
☐ Other: \_\_\_\_\_ ☐ Not All Utilities Marked Per Table 1 (notify marking service)

Measurements Taken: ☐ Yes ☐ No

Documentation of Marks: ☐ Photos ☐ Video ☐ Other: \_\_\_\_\_

**EXCAVATION:**

Utilities Accurately Marked? ☐ Yes ☐ No

If no, describe: \_\_\_\_\_

Were Unmarked or Mis-Marked Utilities Encountered? ☐ Yes ☐ No

If Yes, Specify: \_\_\_\_\_

Locating Service Notified? ☐ Yes ☐ No

Will Excavation Continue Past Locate Number Expiration? ☐ Yes ☐ No

If Yes, Locate Number Renewed? ☐ Yes ☐ No New Expiration Date: \_\_\_\_\_

Any Other Problems/Concerns? Specify: \_\_\_\_\_

Form Completed By:	Signature:	Date:
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**FLD 34 UTILITIES - ATTACHMENT B  
UNDERGROUND UTILITIES MANAGEMENT CHECKLIST**

*Weston Solutions, Inc.*

**To be Completed by PM and/or "Competent Person"  
Complete Form as Project Progresses and Maintain in Site Files.**

PHASE	TASK	Y E S	N O	N A	COMMENTS Required if Response is No or NA. (Reference Item Number)
<b>Pre-Planning</b>	1. Excavation in Work Scope?				
	2. Underground Utilities Identified?				
	3. Competent Person Assigned?				
	4. Has a Copy of the Applicable State Regulations Been Obtained, Read, Understood?				
	5. EHS Plan Addresses Underground Utilities? (AHAs, Contingency Plan, State Regulations Appendix)				
<b>Identifying, Locating and Marking</b>	6. Locating and Marking Checklist Initiated? (Attachment A)				
	7. Identification and Address of Property Determined, Including Nearest Intersection?				
	8. One-Call Agency Contacted?				
	9. Additional Locating and Marking Required on Property? (One-Call agency marks to public property line only)				
	10. Additional Marker/Locator Identified?				
	11. Additional Marker/Locator Qualified?				
	12. Weston Self-Performing Location and Marking?				
	13. If Yes to 12 Above, Approval From Division EHS Manager?				
	14. Area of Excavation "White-Lined" by WESTON?				
	15. WESTON Present When Markings Completed?				
	16. All Utilities Marked? (Refer to Attachment A, Table 1)				
	17. All Markings Photo/Video Documented?				
	18. Area Checked for Signs of Previous Excavation? (Subsidence, new grass, patching, etc)				
	19. All Applicable Information Recorded on Attachment A?				
	20. Multiple Contractors Excavating On-Site?				
	21. Separate Locate Requests for All Contractors?				
	22. WESTON Subcontractors Excavating in WESTON White-Lined Area(s)?				
	23. If Yes to 22 Above, One-Call Agency Contacted to Determine if WESTON Subcontractor Can be Added to Existing Locate Ticket?				
<b>Excavation Activities</b>	24. Meeting and Site Walkover Conducted with Project Personnel? (Managers, Equipment Operators, Laborers, Competent Person, Excavation Observer, etc)				
	25. AHA and HASP Review Conducted With Personnel?				
	26. Do Site Activities Have Potential to Obliterate Utility Markings?				
<b>Excavation Activities – Cont'd</b>	27. If Yes to 26 Above, Have Provisions Been Made to Preserve Markings?				

PHASE		TASK	Y E S	N O	N A	COMMENTS Required if Response is No or NA. (Reference Item Number)
	28.	Has an Excavation Observer Been Designated to Monitor Excavation When Occurring within 4 Feet of the Buffer Zone?				
	29.	Have Operator and Observer Reviewed Commands and Signals?				
	30.	Has WESTON-Required 4-Foot Buffer Zone Been Marked on Either Side of Markings Placed by Locator?				
<b>Excavation Within Buffer Zone</b>	31.	Is Excavation Within The Buffer Zone Absolutely Necessary?				
	32.	If Yes to 31 Above, Can Non-Aggressive Methods Be Used For Excavation In The Buffer Zone? If Yes, Identify Appropriate Non-Aggressive Methods.				
	33.	If No to 32 Above, Has a Buffer Zone Exemption Request Been Approved? If No, then Aggressive Methods May Not Be Used in The Buffer Zone.				
	34.	If Yes to 33 Above, Has the Utility Been De-Energized, Purged, Verified/Tested, and Locked-Out? Or,  Has The Depth and Orientation of the Utility Been Adequately and Visually Determined Through The Use of Non-Aggressive Methods?				
	35.	If Yes to 34 Above, Have All of The Following Conditions Been Met?  For Utilities Containing Electrical Energy, Is The Depth of The Water Table Below The Depth of The Utility?  Have Regulations Been Consulted to Determine Specific State Requirements Relative to Excavating in The Buffer Zone?  Have Appropriate Physical Protection Measures Been Implemented to Prevent Equipment Contact With Utilities and to Prevent Damage to Utilities?  If No to Any of The Above Conditions, Then Only Non-Aggressive Excavation Methods May Conducted in The Buffer Zone, Since The Conditions of The Exemption Have Not Been Satisfied.				
<b>Working Around Exposed Utilities</b>	36.	If Necessary, Have Provisions Been Made to Support the Utility During Work Activities?				
	37.	Have Spoils Been Placed as far Away From the Excavation as Feasible?				
	38.	Has the Utility Been De-Energized? (If Any Portion of the 4-Foot Buffer Zone around a Utility is Inside of the White-Lined Area)				
	39.	Has the Isolation Point for the De-Energized Utility Been Physically Locked-Out?				
<b>Working Around Exposed Utilities – Cont'd</b>	40.	If No to 39 Above, Has a Spotter Been Assigned to Monitor Isolation Point?				
	41.	If Yes to 40 Above, Does the Spotter Have Adequate Communications? (Radio, Telephone, etc)				
	42.	Has the Isolation Point Been Tagged?				
<b>Damage Discovery</b>	43.	Has Pre-Existing Damage to a Utility Been Discovered During Excavation?				

PHASE	TASK	Y E S	N O	N A	COMMENTS Required if Response is No or NA. (Reference Item Number)
	44. If Yes to 43 Above, Has the One-Call Agency and/or Utility Owner Been Notified?				
	45. If Yes to 43 Above, Have Photographs Been taken?				
Encountering or Contacting Underground Utilities	46. Have Utilities Been Encountered in Locations That Have Not Been Marked?				
	47. If Yes to 46 Above, Has the One-Call Agency or Other Locating Service Been Contacted?				
	48. If Yes to 46 Above, Has the PM and PESM Been Notified?				
	49. If Yes to 46 Above, Has a WESTON Notification of Incident (NOI) Report Been Completed? (Include Photographs)				
	50. Have Excavation Equipment Come In Contact With Underground utilities?				
	51. If Yes to 50 Above, Were Intrusive Activities Immediately Curtailed?				
	52. If Yes to 50 Above, Has a Damage Determination Been Made From a Safe Distance?				
	53. If Yes to 50 Above, Has the Area Been Secured?				
	54. If Yes to 50 Above, Have Emergency Responders Been Notified?				
	55. If Yes to 50 Above, Has the Locating Agency and/or Utility Owner Been Notified?				
	56. If Yes to 50 Above, Have State and Local Reporting Requirements Been Met?				
	57. If Yes to 50 Above, Were Intrusive Activities Curtailed Until; Inspection From Utility Owner, Orientation and Depth of Utility Was Determined and Marked, Permission From Emergency Responders Given?				
58. If Yes to 50 Above, Has a WESTON Notification of Incident (NOI) Report Been Completed? (Include Photographs)					

CHECKLIST COMPLETED BY:

_____	_____	_____
NAME	SIGNATURE	DATE
_____	_____	_____
NAME	SIGNATURE	DATE

## **DRAFT**

# **FLD 34-A: WORKING NEAR ENERGIZED OVERHEAD UTILITY LINES & EQUIPMENT**

## ***INTRODUCTION***

This procedure establishes guidelines for working near energized electrical systems based on OSHA Standards and the N.Y.S. High Voltage Proximity Act (HVPA). It applies to all Weston Solutions, Inc. (Weston) operations, and to contractors and consultants working for Weston, and includes tree work; aerial lift and crane work; movement of construction and other work vehicles; survey; and other operations that could cause employees or equipment to contact or enter into dangerous proximity to energized electrical systems.

When working near electrical lines or equipment, avoid direct or indirect contact. Direct contact is contact with any part of the body. Indirect contact is when part of the body touches or is in dangerous proximity to any object in contact with energized electrical equipment. Two assumptions should always be made: 1) that lines are 'live' (energized); and 2) carry high voltage. Electrical lines can only be considered 'dead' when verified by the utility.

When there is any question about voltage and safe distance, the owner of the lines or equipment must be called in advance of work. As voltages increase, minimum clearances increase. Through arcing, injuries or fatalities may occur even if actual contact with high voltage lines or equipment is not made. Potential for arcing increases as voltage increases. Weather and contact with conductors such as tools can increase the possibility of becoming energized without contact.

## ***HIGH VOLTAGE PROXIMITY ACT (HVPA)***

The N.Y.S. High Voltage Proximity Act applies to electrical systems carrying 600 volts or more and has requirements that Weston will adopt for its operations:

- Ensure employees are not placed in proximity to high voltage. Proximity is defined as within 10 feet up to 50 kilovolts.
- Inform employees of the hazards and precautions when working near high voltage.
- Post warning decals on equipment regarding 10 foot minimum clearance.
- Ensure that when an equipment operator is unable to assess clearances a 'spotter' observes for clearance and directs the operator.
- Notify the utility at least 5 working days before any work begins which requires the utility to identify voltages and clearances, or de-energize, insulate or relocate lines.

The first line of defense in preventing electrical contact accidents is to remain outside the minimum clearances. Because Weston employees are not qualified to determine voltage, the utility shall be called to establish voltages and minimum clearances, and take appropriate action to render the work safe. Where notification cannot be made 5 days prior to beginning work, efforts shall be made to request the utility to respond immediately.

## ***PROCEDURES***

### **A. GENERAL**

Prior to the start of a Weston activity where contact with energized electrical systems is possible, the supervisor or his/her designee (e.g., Site Safety Officer) shall identify energized lines or equipment, and reference their location to prominent physical features, or physically mark the pavement beneath overhead lines with spray paint, survey tape, or other means. Their location shall be discussed at a pre-work safety meeting of all employees on the job. Contractors working with Weston shall attend this meeting and require their employees to conform to established electrical safety standards. New employees will be informed of electrical hazards and proper procedures.

On construction projects, the Project Supervisor shall identify and reference all potential electrical hazards. Energized electrical lines or equipment will be conspicuously marked and workers will be reminded of their location by the Project Supervisor. New employees shall be informed of electrical hazards and proper precautions and procedures. These procedures shall be adhered to by contractors subject to the compliance procedures of the contract, including work stoppage in extreme cases. The same steps shall be taken on consultant inspection construction projects and engineering contracts using consultants.

Where there is potential for proximity or contact with energized electrical systems, utilities shall be called to decide the need to de-energize or insulate lines, or otherwise protect against accidental contact. Where there is a suspicion of low wires (under 18 feet), the utility shall be notified to verify and take appropriate action.

### **B. HIGH RISK TASKS**

#### **1. Aerial Lifts, Cranes, Boom Devices**

Where there is potential for proximity or contact with energized lines or equipment, work shall not begin until a safety meeting is conducted and appropriate steps taken to identify, mark, and warn against accidental contact. The supervisor will review operations daily to ensure compliance.

Where the operator's visibility is impaired, a spotter shall guide the operator. Hand signals shall be used and clearly understood between operator and spotter. When visual contact is impaired, the spotter and operator shall be in radio contact.

Aerial lifts, cranes, and boom devices shall have appropriate warning decals.

#### **2. Tree Work**

Wires shall be treated as live and high voltage until verified by the utility. Branches touching wires shall be removed by the utility before work begins. Limbs and branches shall not be dropped onto overhead wires. If limbs or branches fall across electrical wires, all work shall stop immediately and the utility called.

When climbing or working in trees, pruners shall try to position themselves so that the trunk or limbs are between their body and electrical wires. If possible, pruners shall not work with their back toward electrical wires. A bucket truck is the preferential method of pruning when climbing poses a greater electrical contact threat.

Personal protective gear shall have appropriate dielectric characteristics needed for working near electricity.

### 3. Building Demolition and Renovation

Employees working on electrical systems shall be knowledgeable about and employ appropriate Weston Lock-Out/Tag-Out procedures to prevent exposure to unguarded electrical systems.

**GENERAL**

Steam is often used in equipment decontamination processes at hazardous waste sites. Steam cleaning equipment has the same hazards as facility steam lines in that there are hot surfaces to contact, the steam itself is a thermal burn hazard, steam cleaners are often augmented by high pressure, and in enclosed areas, steam may displace oxygen and increase heat stress risk.

**REFERENCES**

Related FLD OPS:

*FLD01 – Noise Protection*

*FLD03 – Hot Processes - Steam*

*FLD05 – Heat Stress Prevention and Monitoring*

*FLD06 – Cold Stress*

**PROCEDURE****Recognition and Risk Assessment**

In the planning stages of a project and safety plan, the potential for injuries from steam must be considered as a physical hazard in the site-specific Health and Safety Plan (HASP). Risk assessment can be accomplished in the development stages of a project by listing in the HASP, the most likely steam injuries which may occur. The SHSC must make decisions on the proper safety procedures and recommend them to the site manager. Each worker must evaluate the risk associated with his or her work and be actively alert to these hazards. Any site worker may stop work if safety procedures are not followed or the risk is too great.

High-pressure water washing (or cleaning, jetting) is defined as the use of high-pressure water, with or without the addition of other liquids or solid particles, to remove unwanted matter from various surfaces, where the pressure of the liquid jet exceeds 1000 PSIG at the orifice (or nozzle). The lower limit of 1000 PSIG does not mean that pressures below 1000 PSIG cannot cause injury or require any less attention to the principal of these recommended practices. Adequate precautions, similar to those of these recommended practices, are required at all pressures. As a guideline, these recommended practices are applicable where the product of pressure times flow exceeds 2000 PSIG.

Injuries caused by the impact of a water jet may appear insignificant and give little indication of the extent of the injury beneath the skin and the damage to deeper tissues. Large quantities of water may have punctured the skin, flesh, and organs through a very small hole that may not bleed. Personnel injured by a pressure washer require immediate hospital attention, and medical staff must be informed of the cause of the injury. To ensure that this is not overlooked, medical staff should be advised that, in previous cases of water jet punctures, unusual infections from micro-aerophilic organisms occurring at lower temperatures have been reported. These may be gram-negative pathogens such as those found in sewage. Bacterial swabs and blood cultures may, therefore, be helpful.

This operating procedure provides only minimum general requirements. In addition the equipment manufacturer's manual should be read and followed.

## **Prevention and Protection Programs**

### **Pressure Washing Equipment Requirements**

Automatic pressure relief:	The system shall be equipped with an automatic pressure relief device on the discharge side of the pump, adjusted so that the manufacturer's maximum allowable system pressure is not exceeded.
Pressure gauge:	The system shall be equipped with a gauge to indicate the pressure being developed.
Electrical controls:	All electrical controls shall be either fail safe, low-voltage, or protected with an approved ground fault circuit interrupter.
Operator controls:	The on – off control (trigger) used by the operator to control the flow of high pressure water to the nozzle shall include a "dead man" shut-off feature which automatically stops the flow of high-pressure water to the nozzle whenever the operator lets go of the control.

### **Personal Protection and Equipment Requirements**

The following personal protective equipment is to be available and worn as necessary, based on HASP requirements and/or direction of the SHSC. Additional equipment may be necessary if chemical or other hazards are present.

Whole Body:	Splash protection. Liquid/chemical resistant suits may be necessary based on HASP requirements.
Head:	Hard hat, as necessary
Eyes and Face:	Face shield
Foot:	Waterproof American National Standards Institute (ANSI)-approved safety boots
Hearing:	Ear plugs or ear muffs, as necessary.

### **Training**

Only trained (experienced) personnel shall operate high-pressure washing equipment, and supervise the training of new operators. Where equipment is rented or newly purchased and no one on the project team has prior experience with this equipment, the vendor shall be required to provide training in the proper use of the equipment. Training should include the following:

Cutting Action – Cutting action and potential hazard to the human body shall be demonstrated through the use of the equipment (e.g., cut through a piece of lumber, concrete block)

Personal Protective Equipment – The minimum required personal protective equipment shall be explained.

Revised 11/1999

**System Operation** – The operation of the system shall be explained, including potential problems and proper corrective actions.

**Control Devices** – The operation of all control devices shall be explained, particularly pressure control and relief devices. The importance of not tampering with any control devices shall be stressed, as well as the importance of keeping them functional.

**Hose** – The proper method of connecting hoses shall be explained, including laying out without kinks, protection from excessive wear, and proper methods for using couplings and fittings.

**Stance** – The proper stance for sound footing shall be demonstrated.

**Proficiency** – Personnel being trained shall demonstrate knowledge in the safe use of the equipment through practical application under the direction of the trainer.

### **Operational Rules**

Never operate the equipment above the manufacturer's rated pressure maximum.

Increase pressure slowly until required working pressure is reached.

Always rope off the area to be cleaned.

Always be aware of nozzle location. Never point nozzle at a person. Remember that a water jet can puncture splash suits, safety boots and other protective clothing.

Revised 11/1999

## **FLD 38      HAND AND POWER HAND TOOLS**

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### **GENERAL**

### **REFERENCES**

Related FLD OPS:

*FLD01 – Noise Protection*  
*FLD02 – Inclement Weather*  
*FLD08 – Confined Spaces Entry*  
*FLD09 – Hot Work*  
*FLD10 – Manual Lifting and Handling of Heavy Objects*  
*FLD12 – Housekeeping*  
*FLD16 – Compressed Gases*  
*FLD22 – Heavy Equipment Operation*  
*FLD24 – Aerial Lifts/Manlifts*  
*FLD29 – Materials Handling*  
*FLD30 – Hazardous Materials Use and Storage*  
*FLD31 – Fire Prevention/Protection/ Response Plans*  
*FLD32 – Fire Extinguishers Required and Requirements*  
*FLD34 – Utilities*  
*FLD35 – Electrical Safety*

### **PROCEDURE**

Work with other than the simplest non-powered hand tools shall be performed only by those persons competent by reason of formal training or documented experience.

Unsafe hand tools shall not be issued or used. All hand tools will be kept in good repair and used only for the purposes for which they were designed. Wrenches with sprung jaws, where slippage could occur, impact tools with mushroomed heads, and wooden handled tools with cracks or splinters are examples of unsafe hand tools.

Tools having defects that will impair their strength or render them unsafe will be tagged or made inoperable and removed from service.

Guards must be in place during operation on all power tools designed to accommodate them. Guards and safety devices must remain in place on power tools unless removed according to manufacturer's instruction for maintenance by a competent person and must be replaced before use. Belts, gears, shafts, drums, flywheels, chains or other rotating, reciprocating, or moving parts exposed to employee contact, or representing other hazards, must be guarded.

Proper personal protective equipment (PPE) must be used when operating power tools or hand tools that may produce projectiles, cuts or abrasions, dusts, fume, mists, or light, or which pose a risk of harm to arms, legs, or feet if dropped.

Revised 11/1999

Throwing tools or materials from one location to another, from one person to another, or dropping them to lower levels, is not permitted.

Only nonsparking tools will be used in locations where sources of ignition may cause a fire or explosion.

Power tools will be inspected, tested, and determined to be safe for operation prior to use. Continued periodic inspections will be made to ensure safe operating condition and proper maintenance.

Electric powered tools must be approved double-insulated or grounded in accordance with 1926.404.

Rotating or reciprocating portable power tools will have a constant pressure switch that will shut off the power when the tool is released by the operator. A portable power tool may have a lock-on control provided turn-off can be accomplished by a single motion of the same finger or fingers that turned it on.

Hydraulic fluid used in powered tools will retain its operating characteristics at the most extreme temperatures to which it will be exposed.

Manufacturer's safe operating pressures for hydraulic hoses, valves, pipes, filters, and other fittings will not be exceeded.

All hydraulic or pneumatic tools that are used on or around energized lines or equipment will have nonconducting hoses having adequate strength for the normal operating pressures.

Loose and frayed clothing, dangling jewelry, rings, chains, and wrist watches will not be worn while working with any power tool or machine. Long hair will be tied back or otherwise secured.

All woodworking tools and machinery will meet applicable requirements of American National Standards Institute (ANSI) 01.1, Safety Code for Woodworking Machinery.

Extension cords:

- Must meet Underwriter's Laboratory (UL) or other rating criteria according to Occupational Safety and Health Administration (OSHA).
- Use will be limited to essential tasks.
- Must be tested for continuity before each use and must be connected to grounded outlets, or ground fault current interrupters must be used.
- Must be inspected daily for loose insulation, broken or missing plugs, bared wires, or other hazards.
- Grounding of outlets used for portable tools must be confirmed before use.
- Must not be allowed to become tripping or slipping hazards.
- Must not be used for lifting or tying off, and shall be disconnected by pulling on the plug.

Any piece of equipment used for lifting materials or personnel shall be used and maintained in strict accordance with manufacturer's directions and applicable OSHA regulations.

Revised 11/1999

Load limits will be visibly posted on all lifting devices.

Only operators with demonstrated competence shall be permitted to operate lifting devices.

Lifting machinery, and all elements of equipment involved in lifting or supporting loads, must be inspected prior to use and then monthly, at a minimum. Inspections must be performed by a competent person and must be documented.

Revised 11/1999

## FLD 41      HAND AND EMERGENCY SIGNALS

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### GENERAL

### PROCEDURE

#### HAND SIGNALS:

SIGNAL	MEANING
Hands on top of head	Need assistance
Grip partners wrist or place both hands around partners arm	Leave area immediately.
Thumbs up	OK; I'm all right
Thumbs down	No; Negative
Hand gripping throat	Cannot breath, out of air
Pointed finger on extended arm	Look in that direction
Wave hands over head from side-to-side	Attention; Stand-by for the next signal
Swing hand from direction of person receiving signal to directly overhead and through in circle	Come here
Clenched fist of extended arm	Stop motion
Draw index finger across front of throat	Shut off engine; cut off power

#### EMERGENCY SIGNALS:

SIGNAL	MEANING
One long sound of the emergency alarm signal	Emergency situation, face safety watch and watch or listen for directions
Pause; followed by a number of short sounds, 1, 2, 3 or 4	Evacuate to the pre-designated emergency meeting place indicated by the number of sounds

Revised 11/1999

## SITE-SPECIFIC HAZARD COMMUNICATION PROGRAM-FORM 28

### **Location-Specific Hazard Communication Program/Checklist**

To ensure an understanding of and compliance with the Hazard Communication Standard, WESTON will use this checklist/document (or similar document) in conjunction with the WESTON Written Hazard Communication Program as a means of meeting site- or location-specific requirements.

While responsibility for activities within this document reference the WESTON Safety Officer (SO), it is the responsibility of all personnel to effect compliance. Responsibilities under various conditions can be found within the WESTON Written Hazard Communication Program.

To ensure that information about the dangers of all hazardous chemicals used by WESTON are known by all affected employees, the following Hazard Communication Program has been established. All affected personnel will participate in the Hazard Communication Program. This written program, as well as WESTON's Corporate Hazard Communication Program, will be available for review by any employee, employee representative, representative of OSHA, NIOSH, or any affected employer/employee on a multi-employer site.

- ☒ Site or other location name/address: Ellsworth Industrial Park, Downers Grove, IL
- ☒ Site/Project/Location Manager: Kurt Fischer, Project Manager
- ☒ Site/Location Safety Officer: Barry Crawford, SHSC
- ☒ List of chemicals compiled, format: ☒ HASP ☐ Other: TCE, PCE
- ☒ Location of MSDS files: HASP (on site)
- ☒ Training conducted by: Name: Barry Crawford Date: \_\_\_\_\_
- ☒ Indicate format of training documentation: ☒ Field Log ☐ Other: \_\_\_\_\_
- ☒ Client briefing conducted regarding hazard communication: PM
- ☒ If multi-employer site (client, subcontractor, agency, etc.), indicate name of affected companies:  
TBD
- ☒ Other employer(s) notified of chemicals, labeling, and MSDS information: TBD
- ☒ Has WESTON been notified of other employer's or client's hazard communication program(s), as necessary? ☐ Yes ☒ No

### **List of Hazardous Chemicals**

A list of known hazardous chemicals used by WESTON personnel must be prepared and attached to this document or placed in a centrally identified location with the MSDSs. Further information on each chemical may be obtained by reviewing the appropriate MSDS. The list will be arranged to enable cross-reference with the MSDS file and the label on the container. The SO or Location Manager is responsible for ensuring the chemical listing remains up-to-date.

### **Container Labeling**

The WESTON SO will verify that all containers received from the chemical manufacturer, importer, or distributor for use on-site are clearly labeled.

The SO is responsible for ensuring that labels are placed where required and for comparing MSDSs and other information with label information to ensure correctness.

## ***Material Safety Data Sheets (MSDSs)***

## ***FORM 28***

The SO is responsible for establishing and monitoring WESTON's MSDS program for the location. The SO will ensure that procedures are developed to obtain the necessary MSDSs and will review incoming MSDSs for new or significant health and safety information. He/she will see that any new information is passed on to the affected employees. If an MSDS is not received at the time of initial shipment, the SO will call the manufacturer and have an MSDS delivered for that product in accordance with the requirements of WESTON's Written Hazard Communication Program.

A log for, and copies of, MSDSs for all hazardous chemicals in use will be kept in the MSDS folder at a location known to all site workers. MSDSs will be readily available to all employees during each work shift. If an MSDS is not available, immediately contact the WESTON SO or the designated alternate. When a revised MSDS is received, the SO will immediately replace the old MSDS.

### ***Employee Training and Information***

The SO is responsible for the WESTON site-specific personnel training program. The SO will ensure that all program elements specified below are supplied to all affected employees.

At the time of initial assignment for employees to the work site, or whenever a new hazard is introduced into the work area, employees will attend a health and safety meeting or briefing that includes the information indicated below.

- Hazardous chemicals present at the work site.
- Physical and health risks of the hazardous chemicals.
- The signs and symptoms of overexposure.
- Procedures to follow if employees are overexposed to hazardous chemicals.
- Location of the MSDS file and Written Hazard Communication Program.
- How to determine the presence or release of hazardous chemicals in the employee's work area.
- How to read labels and review MSDSs to obtain hazard information.
- Steps WESTON has taken to reduce or prevent exposure to hazardous chemicals.
- How to reduce or prevent exposure to hazardous chemicals through the use of controls procedures, work practices, and personal protective equipment.
- Hazardous, nonroutine tasks to be performed (if any).
- Chemicals within unlabeled piping (if any).

### ***Hazardous Nonroutine Tasks***

When employees are required to perform hazardous nonroutine tasks, the affected employee(s) will be given information by the SO about the hazardous chemicals he or she may use during such activity. This information will include specific chemical hazards, protective and safety measures the employee can use, and steps WESTON is using to reduce the hazards. These steps include, but are not limited to, ventilation, respirators, presence of another employee, and emergency procedures.

### ***Chemicals in Unlabeled Pipes***

Work activities may be performed by employees in areas where chemicals are transferred through unlabeled pipes. Prior to starting work in these areas, the employee will contact the SO, at which time information as to the chemical(s) in the pipes, potential hazards of the chemicals or the process involved, and the safety precautions that should be taken will be determined and presented.

### ***Multi-Employer Work Sites***

It is the responsibility of the SO to provide other employers with information about hazardous chemicals imported by WESTON to which their employees may be exposed, along with suggested safety precautions. It is also the responsibility of the SO and the Site Manager to obtain information about hazardous chemicals used by other employers to which WESTON

employees may be exposed. WESTON's chemical listing will be made available to other employers, as requested. MSDSs will be available for viewing, as necessary. The location, format, and/or procedures for accessing MSDS information must be relayed to affected employees.

# SITE AIR MONITORING PROGRAM-FORM 29

## Field Data Sheets

Location:

% LEL	% O <sub>2</sub>	PID (units)	FID (units)	Aerosol Monitor (mg/m <sup>3</sup> )	GM: Shield Probe/Thin Window		NaI (uR/hr)	ZnS (cpm)
					mR/hr	cpm		
Monitox (ppm)				Detector Tube(s)				
Sound Levels (dBA)		Illumination	pH	Other	Other	Other	Other	Other

Location:

% LEL	% O <sub>2</sub>	PID (units)	FID (units)	Aerosol Monitor (mg/m <sup>3</sup> )	GM: Shield Probe/Thin Window		NaI (uR/hr)	ZnS (cpm)
					mR/hr	cpm		
Monitox (ppm)				Detector Tube(s)				
Sound Levels (dBA)		Illumination	pH	Other	Other	Other	Other	Other

[illegible]

Date \_\_\_\_\_